Documentation DDC4000

Documentation to set up and maintain the DDC4000.

Version	released for DDC4000	Released by	Comment
0.10 v. 14.10.2004	ß test	-	To use as part of the ß test.
0.11 v. 21.10.2004	-	-	Updating
0.12 v. 13.12.2004	ß	-	Manual influence in DDC, network settings for PPP,
0.13 v. 05.01.2005	ß	-	Directory structure reworked, expression corrections - initiated by Wlk/FE
0.14 v. 10.03.2006	Version 1.0.xx	PAW	System objects reworked (FAX, EMAIL, Config)
0.15 v. 21.3.2006	Version 1.0.xx	PAW	Software objects reworked (additions on the basis of the specifications)
0.16 v. 04.04.2006	Version 1.1.xx	PAW	general revision, system objects added
1.0 v. 23.05.2006	Version 1.1.xx	PAW	first variant for export

1. Introduction

1.1. The idea behind the DDC 4000

The DDC4000 Central Units and bus modules are extensions to the Kieback&Peter product range providing a plant with new options.

The following objectives were aimed at and achieved with the development of the DDC4000 system:

- **Ethernet communication between the DDC4000 Central Units and BMS**
  The central station communication of the DDC4000 system is implemented over the Ethernet. Through the use of current network technology it is possible to connect to the service laptop, BMS or customer networks as well as to network various DDC4000 Central Units cost-effective.
  If an existing JY(St)Y cabling is to be used there is still the option of communicating via this traditional "telephone cable". But for this it is not possible to use the Ethernet's data rate.
- **Flexible, user-friendly user interface**
  The use of a touch screen TFT color display provides a flexible, future-oriented interface that is easy and intuitive to operate and does not have restrictions for future extensions.
- **BACnet native**
  The DDC4000 communicates via the standardized protocol BACnet. BACnet operates in the DDC Central Unit down up to the database structure. This is called a native BACnet implementation. Each parameter is administrated as a BACnet object and for example transported to the BMS. This means unproblematic connection to BACnet clients and therefore minimal projecting effort.
- **Structured parameterizing**
  By illustrating individual plants and their classification in groups, a clearly structured, re-usable projecting is possible. On that ground existing plant elements can be combined with new ones with the lowest effort.
- **Remote control via any Windows PC without additional software**
  To operate and project a DDC4000 central unit you only need a network connection and Internet explorer. No plug-in or additional programs are required. The usual port 80 is used for communication.
  As a result of the Internet integration, access is possible from almost anywhere in the world.
- **checked controls for plant elements**
  The hardware objects, commented later, provide all the usual functions to control the common plant parts, such as pumps, valves, burners etc. The processing of many functions such as operating hour counting and command execution check has already been integrated and is ready for use.
- **2 CAN buses for each DDC4000 central station (each can be switched as a control cabinet or field bus)**
  Both CAN buses can be used as either a field bus or control cabinet bus. This permits higher flexibility for utilizing resources. Many of the known bus devices from the DDC3000 system can still be used; new modules will receive additional functions.
- **Switch modules on the touch screen**
  With the depiction of switches, lamps and values you can easily and effectively implement the individually produced manual operating level.
- **separate customer and service interface**
  The service interface is separate from the intuitive operating interface. It provides a structured and fast access to all functions. The complete plant functionality can be produced or changed from this interface.

- **Integration in the planning tool**
  For fast and effective DDC4000 projecting the planning system PS4000 provides all kinds of support. A flexible database structure ensures that the new DDC4000 functions can be used immediately in the planning system.

- **high computing power**
  Through the use of modern processors, new memory components and the use of the future-oriented and apparently virus-free Linux operating system very powerful DDC Central Units are created.

1.2. Structure of the DDC 4000 system

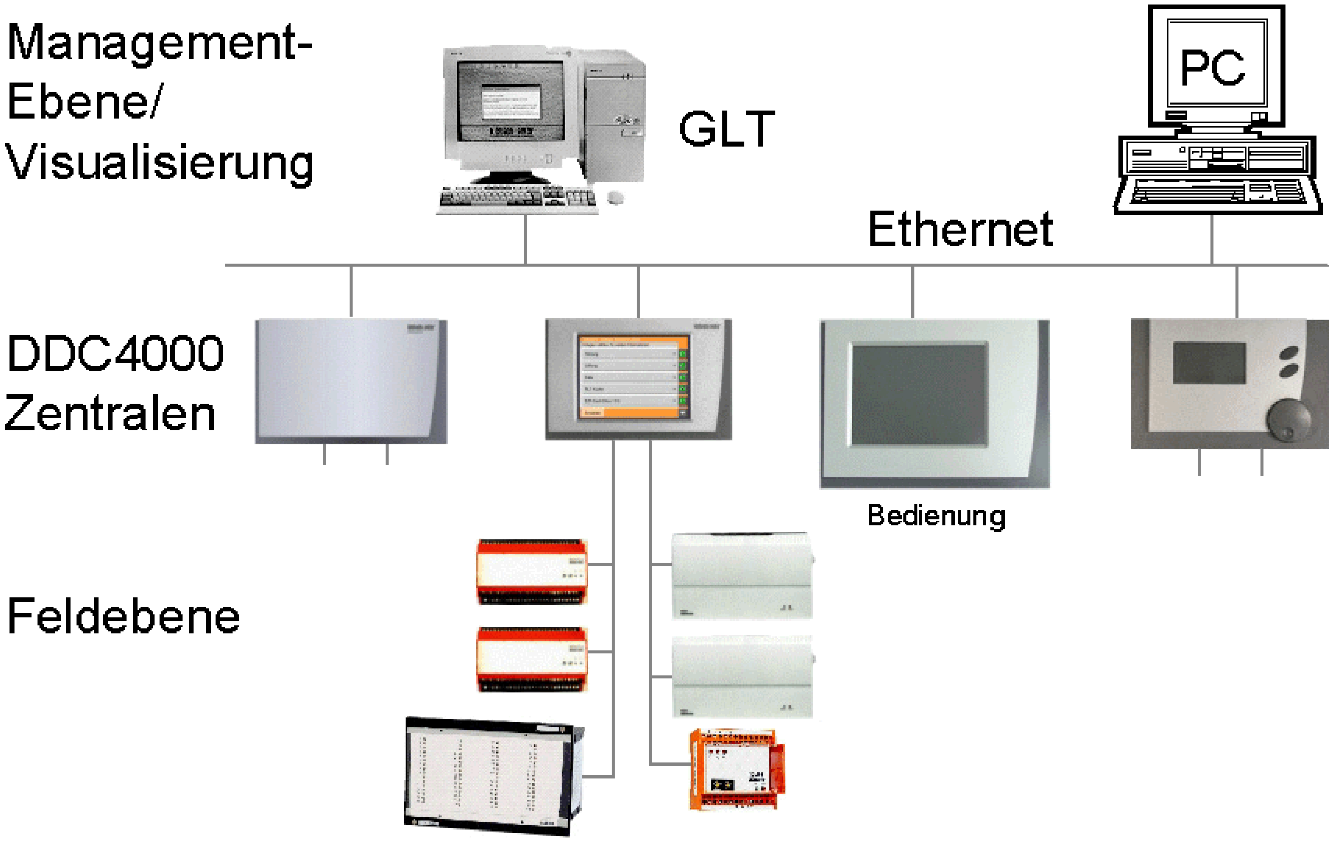
The DDC4000 system is designed hierarchically. The DDC Central Units are as processing units connected with each other via the central bus. The plant was designed for Ethernet operation with 10/100MBit. If existing cable has to be used it is also possible to communicate via J-Y(St)Y.

Superior, but in the same bus system (Ethernet) are the BMS and PCs with visualization via Internet Explorer.

The bus modules and field bus controllers are located under the DDC Central Units. Modules on two different bus systems are used to input and output information.

The control cabinet bus can accept and transfer data at very high speeds. It is used to input a lot of information in the control cabinet and can be used for distances up to 200 meters. Typical modules in the control cabinet bus are BMD4064 and SBM42.

The field bus can transfer data at very high speeds. It is used to collect and output distant information. The amount of transportable information is lower than at the control cabinet bus. It can be used for distances up to 2000 meters. The field bus modules FBM are typical for the field bus.



DDC400 central units model variants

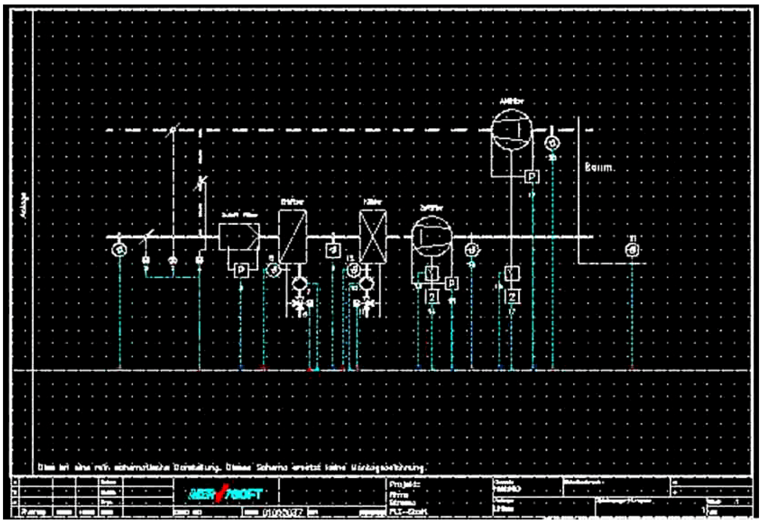
- DDC4200: Color 5.7" TFT touch screen
- DDC4100: Black and white screen with single button operation
- DDC4400: Black box: DDC4000 Central Unit without operating elements

Displaced displays

- DDC4001: touch screen to operate the complete DDC network

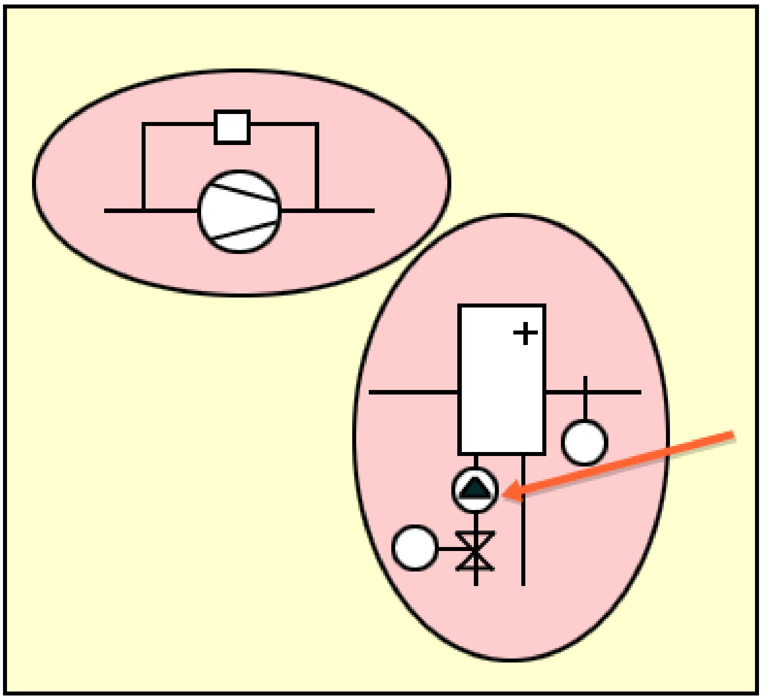
Structure of planning and user guidance

The functions in the DDC Central Unit are strictly classified by **plant**. This may for example be a heating plant with 3 heating circuits. Within one plant parts may be grouped according to logically related functions. One such **group** for example is a heating circuit with the pump, valve and temperature sensor elements. The function of a plant component within a group and group control functions themselves are described by **objects**.
An object usually comprises input parameters, function and output parameters.



Sample plant in preparing the planning with a number of aggregate.

Structure of information points for later planning.



The plants are classified into groups with logically related functions.

e.g. a heating register or a fan with guard.

The DDC4000 objects are sub-divided for better clarity:

- **Software objects**
  The software objects have functions that control the DDC-central unit. These include for example the basic programs heating, ventilation and separate objects such as arithmetic. The basic programs were summarized by function. All software functions that are directly related to the basic ventilation program are found under object number S238. This includes for example the cascade or Y_limitation.
- **Hardware objects**
  The hardware objects describe summarized functions that are used to control plant parts. (for example: operating pumps, fans, burners etc.)
- **Basic objects**
  Simple basic functions are implemented with basic objects as timers, markers, lamps, switches and module clamps - the PINs.
- **Attached objects**
  Parameters may contain attached objects that change them or extend their function. For example you can attach a "F001 scaling" function object to the "control variable sensor" parameter if this parameter shall to be read in and scaled as a 0 ... 10V signal.
- **system objects**
  This includes functions that are processed in the DDC Central Unit. In general they are not directly related to a plant. For example date and time settings or configuring network connections, modems etc. are system objects.
- **Sub-objects**
  These objects are used to describe an object more precisely. A key example is a PIN. Each clamp in the system is represented by a PIN. This PIN can be determinated by a sub-object to a digital or analog input or output.

Therefore the parameterizing is very structured and clear.

2. Operation

2.1. Introduction to operation

Please refer to the DDC4000 instruction manual for detail information.

The user interface is created exclusively with the PS4000 parametering tool. Already by structuring into plants the first operating page is determinated. Therefore there is a summary of the plants in the DDC4000 Central Unit and a quick start bar on the first page.

Depiction of opening page with summary of all plants and the quick start bar

You can obtain a quick overview of the plant's status with the aid of the quick start bar located on the right.
Green means - plant running, white - plant is off, flashing red - plant has produced an unconfirmed malfunction, red constant on - plant has a malfunction, hand symbol - a plant element was switched to manual operation.
In addition it is also possible to select the desired plant very quickly with the aid of the plant indicator shown in the middle of the screen.

Via "log in" each user can be registered on the DDC Central Unit. Depending on the code level entered, this enables changes to the set points and times.

If one of the plant sensors located centrally on the screen is pressed the first "switch" page is opened. This page contains the name that the group has in the DDC. All binary information that have a tick under "visualization" in the PS4000 planning tool are found under this title, e.g. "delivery air fan". Switch groups or LEDs are blend correspondingly. If not all switches, LEDs etc. can be depicted on the first page it is possible to scroll forward using the "arrow keys".

The formation of the "Values" page(s) is similar. All parameters that are also selected for visualization in the PS4000 planning tool are displayed in succession (e.g. current and set points).

If times have been installed in a plant (e.g. weekly program) these are offered for selection and editing via the "times" button.

As the depiction is set in the DDC Central Unit a change to the visualization regulations can only be made via the PS4000 planning tool. The page settings are generated here and stored as a data backup.

The "image" button is for version 1.0.x and 1.1.x without function. It is planned to display plant images to make the plant easier explainable for the customer.

Status information can be displayed in the quick start bar. This makes it visible whether a plant is on, off or in manual mode. Plant malfunctions are also visible.

3. Plant components and bus systems

3.2. central unit bus (Ethernet)

3.2.1. DDC Central Units

3.2.1.1. DDC4200

3.2.1.1.1. Connection occupancy

+24V=	□	41	O	O	61	□	0V=	24V~	□	1	O	O	21	□	0V~
Kk1	□	42	O	O	62	□	Kk17	0V	□	2	O	O	22	□	0V
Kk2	□	43	O	O	63	□	Kk18	BY1	□	3	O	O	23	□	BY13
Kk3	□	44	O	O	64	□	Kk19	BY2	□	4	O	O	24	□	BY14
Kk4	□	45	O	O	65	□	Kk20	BY3	□	5	O	O	25	□	BY15
Kk5	□	46	O	O	66	□	Kk21	BY4	□	6	O	O	26	□	BY16
Kk6	□	47	O	O	67	□	Kk22	BY5	□	7	O	O	27	□	BY17
Kk7	□	48	O	O	68	□	Kk23	BY6	□	8	O	O	28	□	BY18
Kk8	□	49	O	O	69	□	Kk24	BY7	□	9	O	O	29	□	BY19
Kk9	□	50	O	O	70	□	Kk25	BY8	□	10	O	O	30	□	BY20
Kk10	□	51	O	O	71	□	Kk26	BY9	□	11	O	O	31	□	BY21
Kk11	□	52	O	O	72	□	Kk27	BY10	□	12	O	O	32	□	BY22
Kk12	□	53	O	O	73	□	Kk28	BY11	□	13	O	O	33	□	BY23
Kk13	□	54	O	O	74	□	Kk29	BY12	□	14	O	O	34	□	BY24
Kk14	□	55	O	O	75	□	Kk30	0V	□	15	O	O	35	□	0V
Kk15	□	56	O	O	76	□	Kk31	10V/50mA	□	16	O	O	36	□	0V
Kk16	□	57	O	O	77	□	Kk32	GND10V	□	17	O	O	37	□	0V
SMC1 Tx	□	58	O	O	78	□	Z-Bus Tx / +	CAN1 0	□	18	O	O	38	□	CAN2 0
SMC1 Rx	□	59	O	O	79	□	Z-Bux Rx / –	CAN1 +	□	19	O	O	39	□	CAN2 +
SMC1 0V	□	60	O	O	80	□	Z-Bus 0V	CAN1 –	□	20	O	O	40	□	CAN2 –

Contact occupancy, device viewed from behind, to the right: D-sub plug, to the left: Ethernet socket

<u>Please note:</u>
Kk means a software switching option between a contact input and an output.
BY means a software switching option between an analog input and an output.

When connecting a field bus no 12 V DC voltage must be set to the DDC4200.

The SMC1 bus connection (RS232) is used for internal diagnosis purposes.

Only DDC4000 Central Units can communicated with each other via the RS485 (Z bus connection with JY(St)Y). It is not possible to exchange data with a DDC3000 via this.

For the DDC4200 central unit a mini-UPS is available; this requires a longer starting time as the internal energy store has to be charged. The mini-UPS can bridge power breaks of maximum 5 seconds and ensures the system software is switched off properly.

3.2.1.1.2. Technical data

DDC control circuits

- Within the DDC4200 are 12 control circuits available. This matches the range of functions in the DDC3200.

Bus connection

- **Ethernet**
  99 DDC4000 Central Units can be administrated,
  networked globally via active network components,
  10/100 Mbits/s

- 2 CAN busses, can be switched individually as a field or control cabinet bus
  – **Field Bus; F Bus:**
    63 FieldBusModule FBM (in future there are plans for 99 FBMs);
    2000m; 20kBaud, CAN, J-Y(St) Y 2x2x0,8mm²
    At the point furthest from the central unit a termination resistance of 180 Ohm must be attached between "BUS+" and "BUS-".
  – **Control Cabinet Bus; SBM Bus:**
    16 ControlCabinetBusModules SBM;
    200m; 40kBaud, CAN

Interfaces

- **serial RS232**
  Modem, printer
- **CompactFlash**
  for CompactFlash card; update, data backup / file recovery (behind the front panel)

Inputs and outputs

- **32 binary inputs (BE), can be switched individually as binary outputs (BA) by the software**
  Transistor output: Contact load 24V DC; max. 50mA
  Input: to be attached through potential-free contact, of which 8 BE for counting pulses to 80Hz

- **24 analog inputs (AE), can be switched individually as analog outputs (AA) by the software**

Sensor type	Value range and unit
0..10V	0 to 100%
KP10	-50 to +150°C
Pt100	-50 to +150°C
Pt1000	-50 to +150°C
Ni100	-50 to +150°C

Sensor type	Value range and unit
Ni1000 (DIN)	-50 to +150°C
Ni1000 (L&G)	-50 to +150°C
KP250	-50 to +150°C
ML2	-50 to +150°C

Operating voltage

- **for DDC Central Unit**
  24V AC +/-10%; 50..60Hz; 33 VA; 1,4A or
  24V DC +/-10%; 14,4 VA; 0,6A or
  12V DC +/-10%; 12 VA; 1,0A
- **For inputs and outputs**
  24V DC +/-10%

More data:

Fuses	Mains fuse, T 3.15A
Displays	Back-lit color TFT LCD display
Switches/ buttons	1 button to reset the device
Processor	MPC855T; 32 Bit; 80 MHz
Memory	128 MByte Flash Disc, 48MByteSDRAM;1 MByte Flash-PROM (boot)
Operating plant	Embedded Linux
Power outage data backup	10 years, clock component battery-buffered
enclosure type	IP30
Ambient temperature	0..45°C
Environmental humidity	In service: 20..80%rF, non-condensing; inoperative: 5..90%rF, non-condensing
Housing	19" short plastic cassette, 4-way cassette with a base and special connections for Ethernet and RS232 W x H x D; 202mm x 132mm x 137mm
Front panel cutout	200.4mm x 112.0mm
Weight	2,200kg
Designation	CE

3.2.1.1.3. LV help (bids)

To complete service directories (SD)

Automation station
Processor type: MPC 855T
Word length (bit): 32
Max. cycle time (ms): 100
AD/DA converter (bit): 16
Max buffer time, real time clock: At least 5 years
Max buffer time, data: Compact Flash unlimited

Size and type
(MB)
read-only memory: 128 MB Compact Flash
main memory: 48 MB RAM
Max. number of control circuits that can be processed: 21

Max. number of information points that can be processed
Physical: 2 x 16 x 24 binary inputs
communicative: approx. 5000

Max. number of connectable
physical input/output components: 2 x 63

Basic software functions can be extended
Type of expansion: Software objects

Local operating and display unit
Variation 1:
Does the Modular AS have
an integrated operating and display unit as standard? Yes
Variation 2:
Can the Modular AS be extended with an integratable
operating and display unit? Yes
Type: DDC4001
Variation 3:
Can an external operating and display unit
be connected? Yes
Type: PC with browser

Which services can be carried out with the operating and display unit in the variants promted above?
Variants 1, 2 and 3 can be operated, observed and parameterized.

Is bus-wide access to other Modular
automation stations possible? yes

Can an I/O component be deleted from the component bracket
without affecting other AS components
? yes (even under voltage)

Is the deletion of an I/O component from
the AS detected and is this information available
for further processing? yes

3.2.2. Touch panel

3.2.2.1. DDC4001

3.2.2.1.1. Connection occupancy

3.2.2.1.2. Technical data

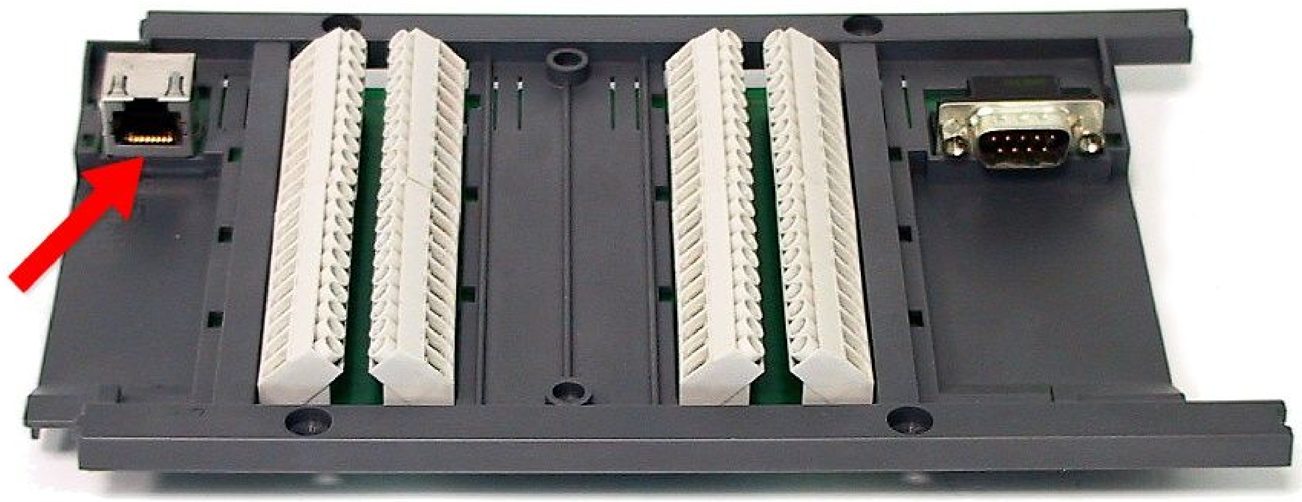
The DDC4001 includes a PC with touch screen functions. All depictions are made in full-screen mode with Internet Explorer.

External size of DDC4001
Total dimensions W x H: (300 x 217.5) mm
Section in control cabinet W x H: (280 x 197.5) mm
Display cut-out (171 x 128) mm
Display diagonals: 213.6 mm (8.4")

3.2.3. Central communication Ethernet

3.2.3.1. General

The communication between the DDC Central Units is designed for an Ethernet connection. For this the DDC Central Units have a socket into which the Cat cable with the RJ45 plug is inserted.



To exchange data between the DDC4000 Central Units and a BMS port #BAC0 is used (BACnet communication).

To exchange data between the DDC4000 Central Units and a PC with Internet Explorer only port 80 is used.

To exchange data between the DDC4000 Central Units ports 19280 and 19281 are used.

3.2.3.2. Ethernet

To use the Ethernet interface the socket on the back of the device is connected with a network cable type Cat.5 (or Cat.6, Cat.7). A difference is made between 1:1 connection (so-called patch cables) and cross-over cables. Cross-over cables are for directly connecting two devices, e.g. a DDC4000 and a service PC. In all other cases a patch cable should be used for example in combination with a switch.

For communication each DDC4000 can use up to 3 IP addresses:

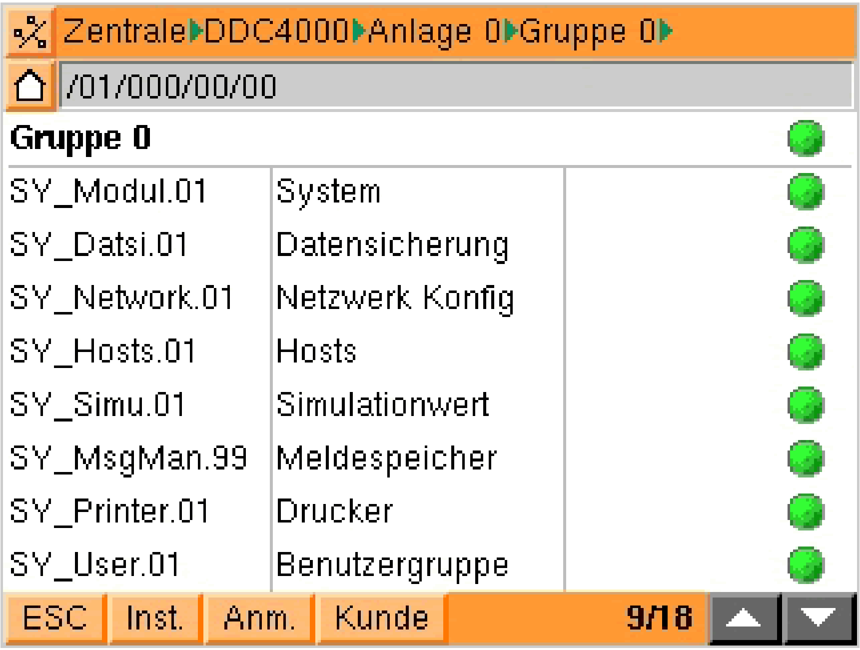
1. for all services when using Ethernet cabling
2. if J-Y(St)Y cabling is used and
3. for connecting via the modem (PPP)

The IP addresses and sub-network mask and any essential gateway address are provided by your system administrator. If a closed network is to be set up, that has no connection to the outside world, the IP addresses can be assigned freely.

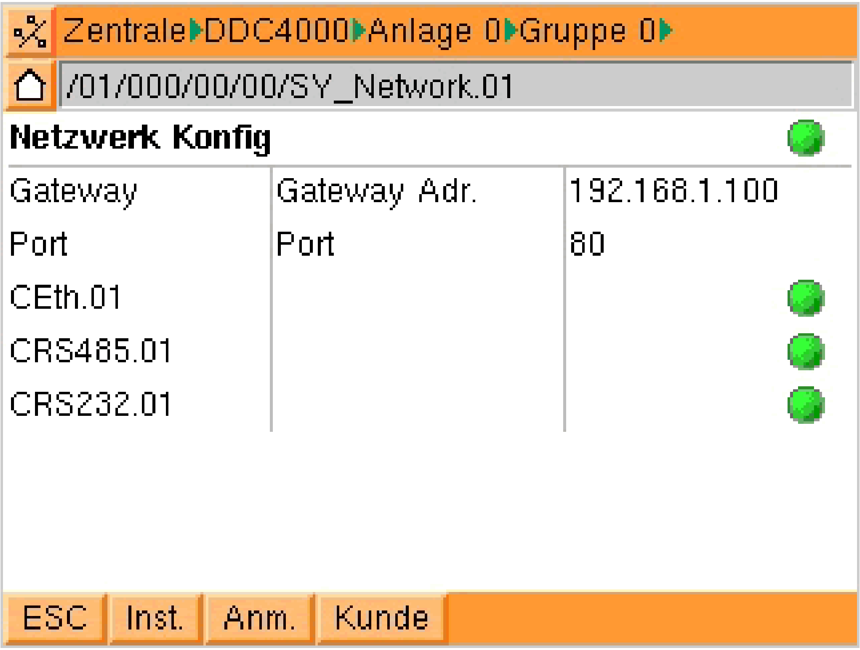
The recommendation in this case is to use the addresses **192.168.1.nnn** for the Ethernet connection. This address is set by default.

3.2.3.2.1. Network settings Sy_Network

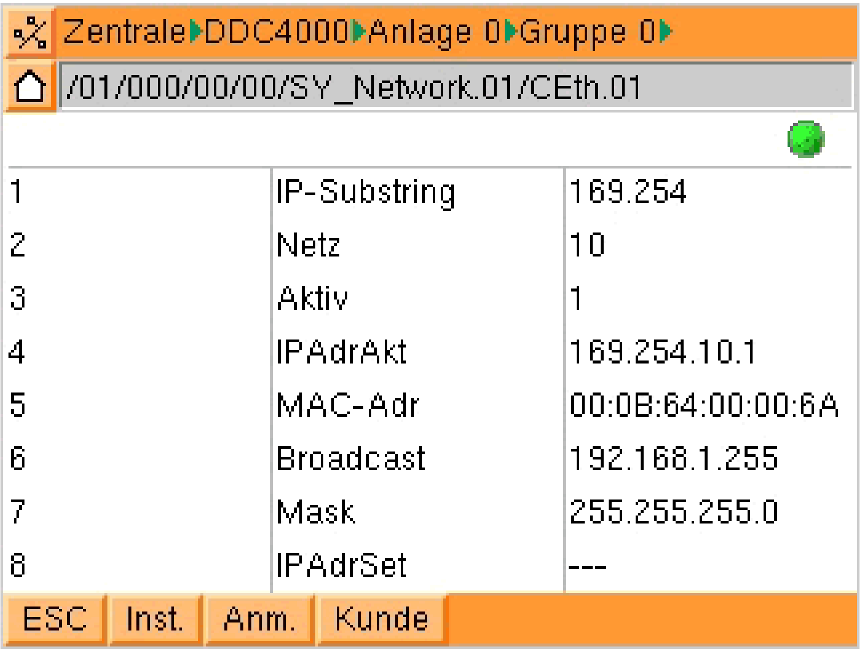
In the service interface plant "00" and group "00" must be opened. The system objects are found there.



The Sy_Network object contains all parameters that are important for TCP/IP communication.



The selection which of TCP/IP interfaces are to be set is made here. The following are available for selection: Ethernet, RS485 (JY-(St)Y) and RS232 (modem). If you type in the middle column; the relevant parameters are displayed.



The address is made up of 3 components.
1. The first two numbers
2. the sub-network (preset to 1 for Ethernet, 2 for RS485 and 3 for RS232)
3. central control unit address

The active IP address is made up of this.
In the IPAdrSet you can also state an independent number. This is required for example if the last number shall be > 99.

Function summary

This object contains the setting parameters for the Ethernet TCP/IP interface.

Function description

The "Ethernet IP Parameter" contains the device's TCP/IP address. If the device ID for BACnet is not set separately in the "Sy_Module" system object ("BACnet DeviceId" parameter) the last number in the RCP/IP address applies to the BACnetDeviceID.

Example: 192.168.0.42 as an IP address, no separately assigned BACnetDeviceID, then "42" is the BACnetDeviceID.

The network is switched on with the aid of the "Ethernet active" parameter. This starts the TCP/IP and BACnet drivers.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
Gateway	**Gateway** Gateway Addr.	set point text	--	--	192.168.1.100	--
MACAdr	MACAdr	actual value text	--	--	00:0B:64:00:00:00	--
Port	UI-Server	set point integer	0	65535	80	--
projNo	**PN** Project Number	set point text	--	--	000-00-00000	--
projSub	**PS** Project SubNetwork	set point text	--	--	1	--

3.2.3.2.2. Other DDC Central Units in the network

TCP/IP addresses of the DDC central control units

System object Sy_Host is used to set up the network.
The TCP/IP addresses of the other DDC Central Units found in the central bus are entered in the parameters.
The PS4000 makes the entry.

Refer to objects -> system objects -> Sy_Host

3.2.3.2.3. Ethernet tests

Communication test

In order to for example check the connection between a laptop and a DDC4000 Central Unit you enter the following at the MS DOS entry request (Start --> Run... --> cmd.exe):

```
ping 172.20.11.75
```

The address of the DDC4000 to be addressed has to be used. (in the above example 172.20.11.75)

A positive answer may look like this:

```
Ping was carried out for 172.20.11.75 with 32 Bytes data:

Response from 172.20.11.75: Bytes=32 time<1ms TTL=127
Response from 172.20.11.75: Bytes=32 time=1ms TTL=127
Response from 172.20.11.75: Bytes=32 time=1ms TTL=127
Response from 172.20.11.75: Bytes=32 time<1ms TTL=127

Ping statistics for 172.20.11.75:
  Packages: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approx. time in milliseconds>
  Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Other helpful commands in the MS DOS entry request:

ipconfig
ipconfig /all

Ipconfig is a Windows program to read network data - indicates IP address, sub-network mask, standard gateway.
Ipconfig/all displays additional information.

3.2.3.3. PC operation with a browser

The DDC Central Units can be operated remotely with the aid of a browser (e.g. Internet Explorer).
For this the Ethernet must be connected to the PC.
Only port 80 can be used for operation. As a result no extra ports need to be released.

After selecting the DDC Central Unit a java applet is loaded. This means that the J2RE (java runtime environment) must be installed on the PC.
Is normally found on all Windows PCs but can also be loaded onto intranet.

Prerequisites

- Laptop with network card, RJ45 connection
- Cross-over network cable (for a 1 to 1 connection from laptop to PC) or patch network cable (when connecting the DDC4000 e.g. via switches)

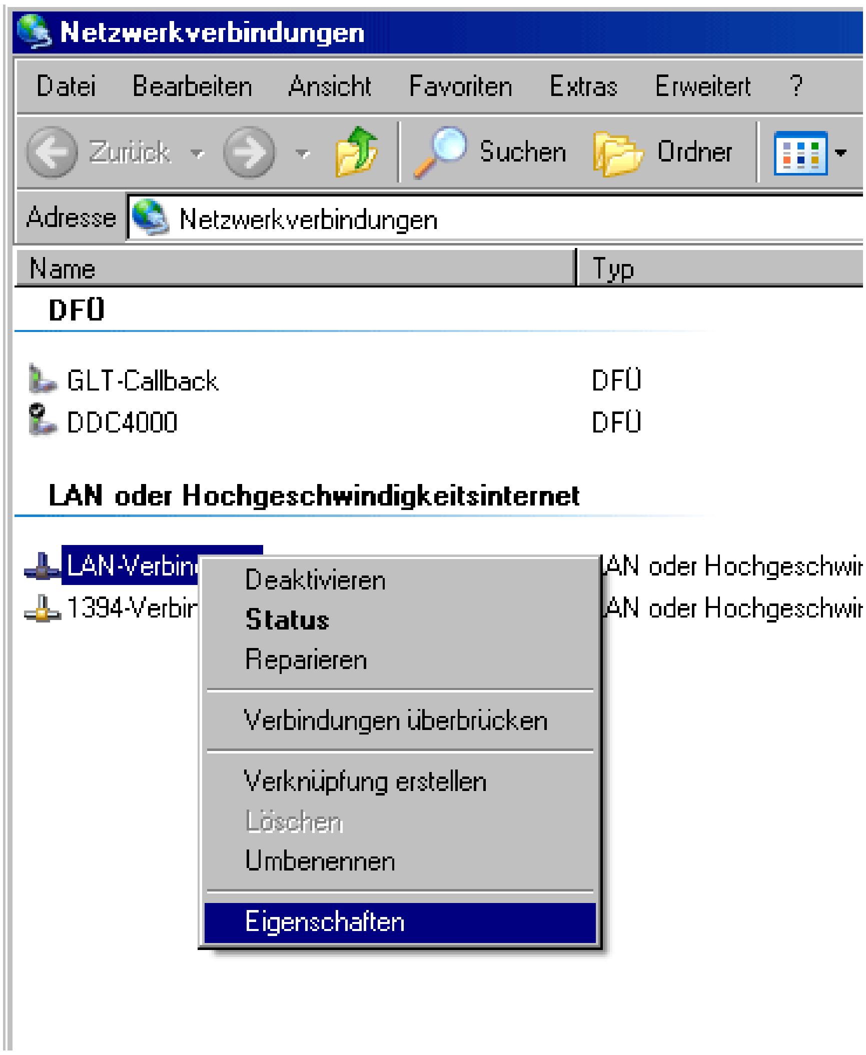
Pre-selections

The DDC4000 and laptop must be in the same network. For this it is necessary to set the IP addresses of the DDC 4000 and the laptop to the same sub-network.

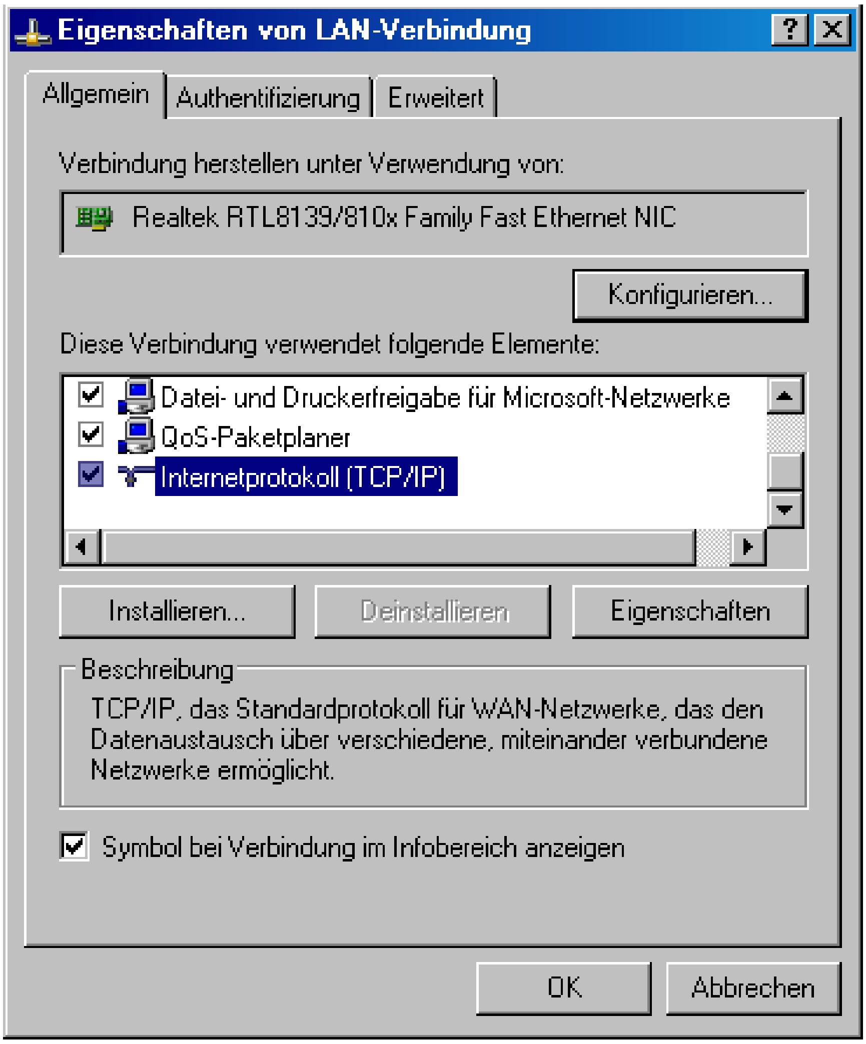
Laptop settings (using Windows XP as the example)

In the Windows taskbar click on <Network connections> via the following path:

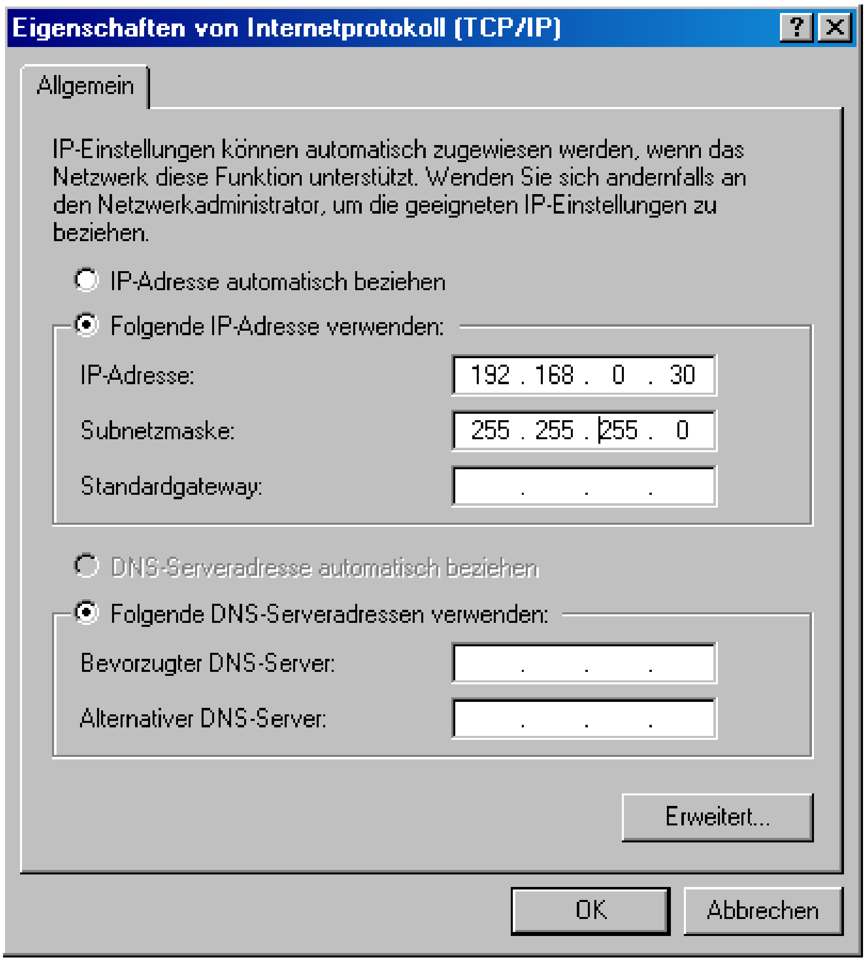
Start --> Settings> --> Control panel --> Network connections



Select the corresponding connection from network connections (e.g. LAN connection) and right click on <Properties>.



In the properties window displayed click on the <Internet protocol (TCP/IP)> element under <General> and click on properties.



A properties window for the internet protocol (TCP/IP) opens. Click on the "Use following IP address" option.

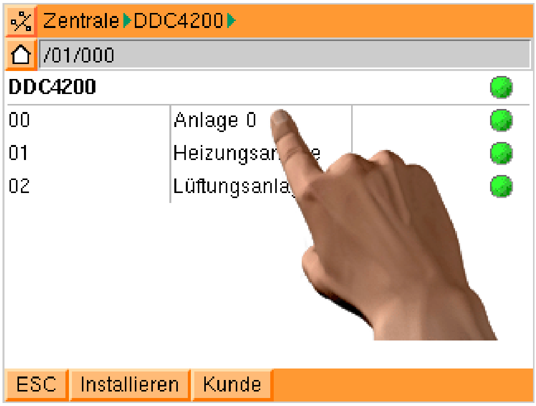
Enter the relevant IP address (e.g. 192.168.0.30) and the appropriate sub-network mask (e.g. 255.255.255.0).
For the example above the DDC4000's IP address may only contain 192.168.0.xxx for communication to be established.

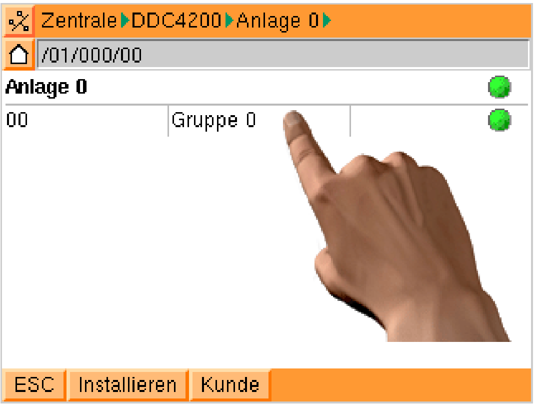
After changing a firmly assigned IP address the laptop must be restarted.

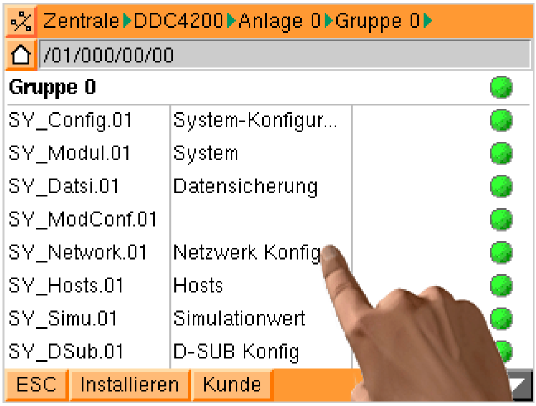
<u>DDC4000 settings</u>

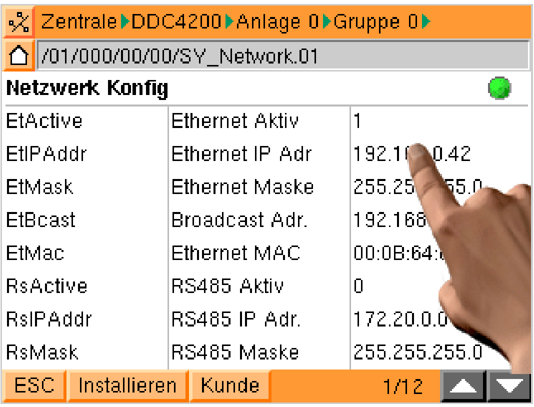
In the DDC4000 the IP address and sub-network mask must be adapted in the following parameters:

xx central unit
  000 Module (Module 000)
    00 plant (plant 0)
      00 group (group 0)
        SY_Network.01 Object.Index
          EtIPAddr Parameter (IP address)
          EtMask Parameter (Sub-network mask)
          EtActive Parameter (switching the Ethernet to active in the DDC4000)









The sub-network mask must be the same as in the laptop. The IP address must not be the same as in the laptop but must match the sub-network mask. The Ethernet must still be switched on via the <EtActive> parameter.

Now it is possible to access the DDC4000 from the laptop via Explorer. To do so enter the DDC4000's IP address in the address field in Explorer. If it is not possible to access the DDC4000 this may be due to the "Java 2 Runtime Environment" software not being installed on the laptop. This software must be installed and can be downloaded from the intranet from the following path:
Documents --> Technical --> DDC4000 system --> Network technology
It can also be found on the Internet by entering the search term "j2re".

The following link structure is used for opening:

1. http://

2. DDC TCP/IP address

Sample central unit address 192.168.0.60:

In Internet Explorer window
http://192.168.0.60

3.2.3.5. BMS connection

A BMS is connected via Ethernet to the DDC4000 system. As the BACnet communication is used for this ensure that **Port #BAC0** is switched freely throughout (router...).

Caution! Version 1.0 and 1.1 do not contain BBMD (BACnet broadcast management device). This means that communication via a router is not possible without an external BBMD.

As a result of the native abilities of the DDC4000 it is also possible to switch to third party products. BACnet/IP is used.

Please refer to the "Ethernet" chapter for the details of the Ethernet cabling and setting up BACnet communication.

Please refer to the BMS documentation on installing and setting up the BMS.

A modem can be connected to the serial interface. A connection to the BMS can be established via the modem with PPP (point to point protocol).
It is not possible to directly connect the BMS via the serial interface.

3.2.3.6. BACnet

A DDC4000 system parameter becomes a transportable parameter through a BACnet attachment function. This occurs for example by selecting the desired parameters in the BMS or the relevant stipulations in the parameterizing tool.

What the DDC4000 can do

Medium: BACnet via Ethernet
Ethernet (ISO8802-3)
Ports: For hexadecimal range BAC0-BACF (47808 - 47823 dec.)

The DDC4000 is a B-BC. The current PICS are found on the intranet.

Initial start-up

Ensure connection:
Ethernet cable (1:1, patch cable) on the DDC to switch or router
Ethernet cable (1:1, patch cable) from laptop to switch or router

or

Ethernet cable (cross-over) direct from DDC to laptop.

<u>Network settings:</u>
The customer must provide the settings even if the DDC network is not initially connected to the customer network it is advisable to obtain the setting data from the customer so that no address conflicts occur when connection is made later.
IP address: e.g. 192.168.8.60
Network mask: e.g. 255.255.0.0
Gateway: e.g. 172.20.11.75

Details on IP address:
Certain addresses and address ranges are assigned special functions:
127.0.0.1 - always the local computer/DDC 4000
10.x.x.x; 172.16.x.x - 172.31.x.x; 192.168.0.x - 192.168.255.x - private addresses that cannot make direct connect with the Internet. In corporate networks addresses are normally selected from this range. These addresses require a gateway (networked computer with Internet connection) to be able to communicate with the Internet.

Details on network mask:
This depends on the customer's corporate network and must be provided by him.

Gateway details:
The DDC4000 contacts the Internet or other networks via this computer **or** if this is not required the entry remains empty.

Use of routers

BACnet/IP works with so-called UDP telegrams. These are not fed through by routers and firewalls. Thus no direct connection between BACnet clients in different network sections that are connected via routers or firewalls is possible.

The use of a BBMD (BACnet Broadcast Management Device) can resolve this problem. A BBMD packages broadcast messages in IP packages and sends these to a distance BBMD. Then a (local) broadcast is transmitted.
The same procedure applies as appropriate for the response telegram - here the remote BBMD sends an IP package to the local BBMD.

Only one BBMD may be used for each network section.

Caution! No BBMD is contained in version 1.0.x and 1.1.x. Access to an external device is necessary for this.

BACnet settings

BACnet network number: e.g. 1
Device name: e.g. DDC4000 server
Device name client: e.g. DDC4000 client
Vendor name: Kieback&Peter (fixed entry)

Vendor ID: 39 (fixed entry)
Device ID: e.g. 1
Device ID Client: e.g. 2
Model name: DDC4200
Communication: o UDP/P, o Ethernet
Operating mode: o Server, o Client, o Both
UDP port: 0xBAC 0

Details on BACnet network number:
The BACnet network number is assigned by the plant administrator and is in the range 1...65535.

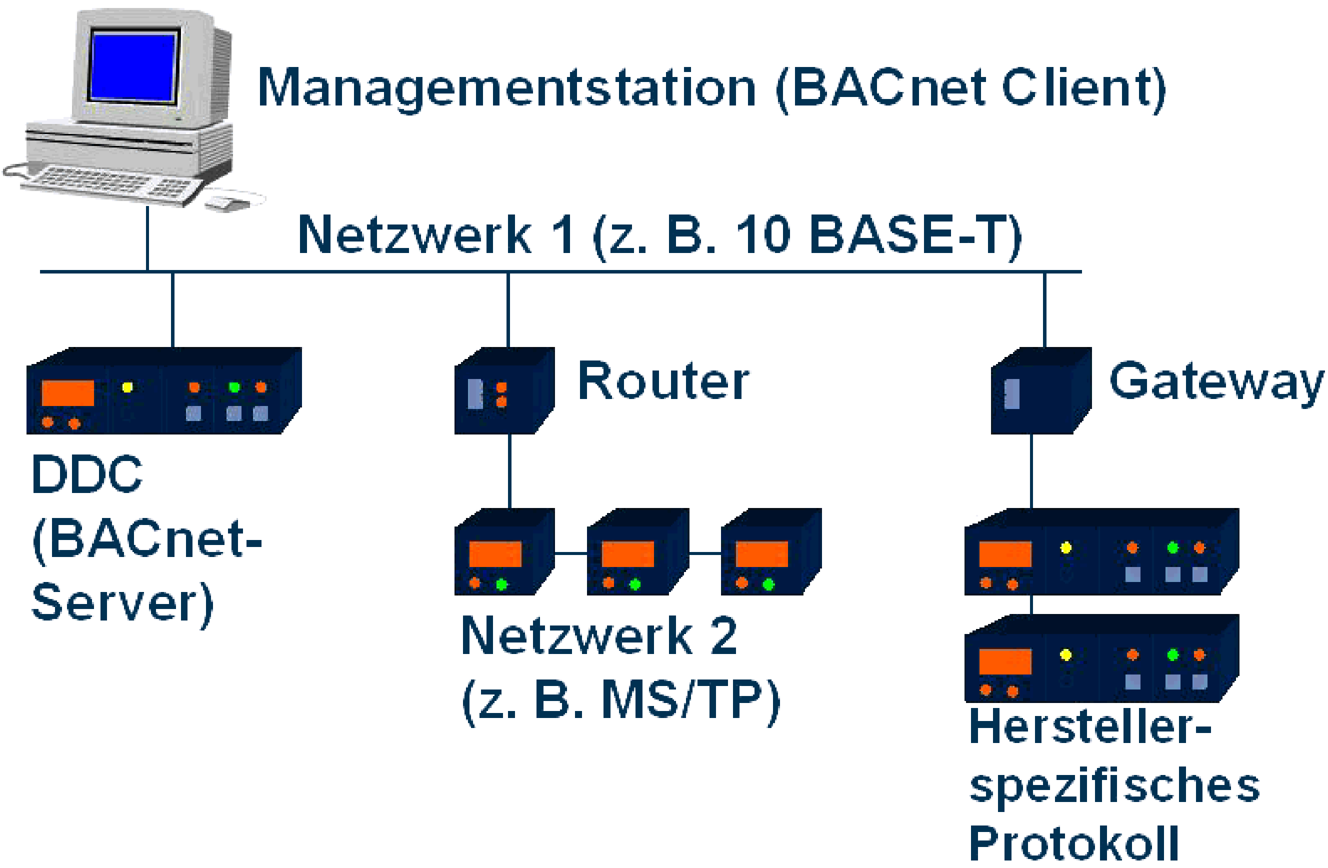
The BACnet network number is used to logically differentiate between various BACnet networks.

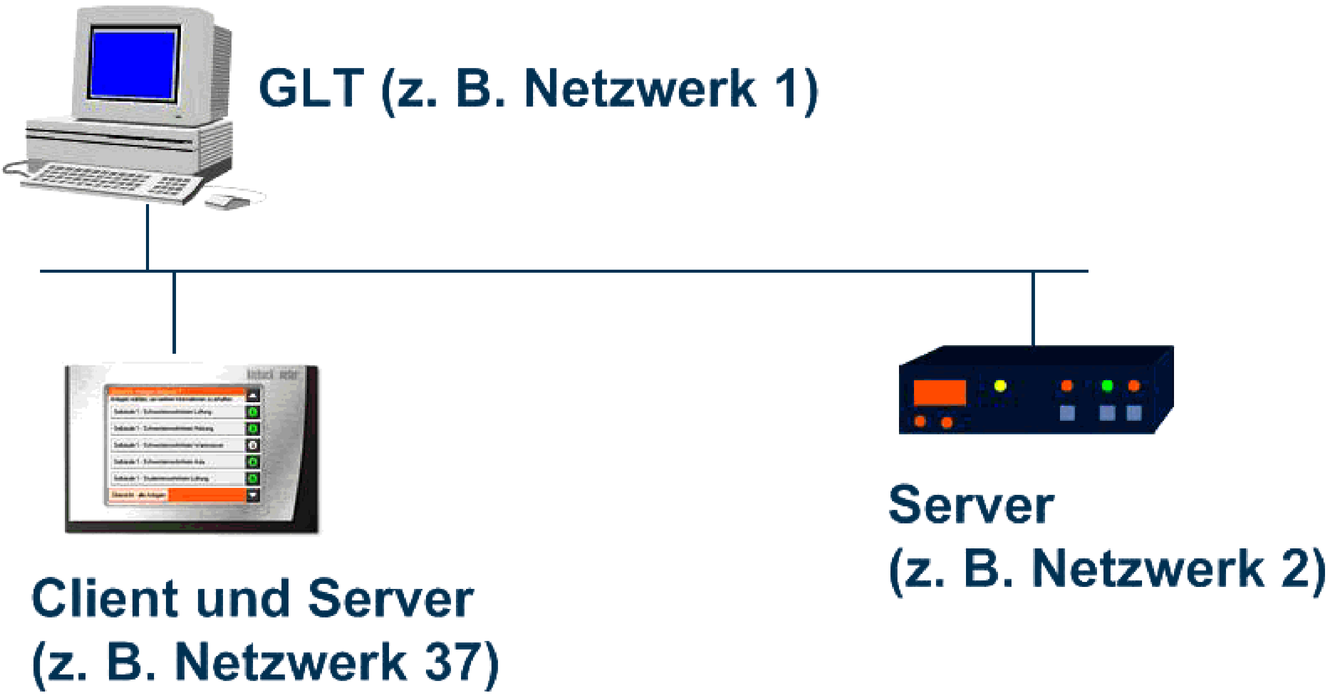
As 6 different data link layers are supported the BACnet network number is used to differentiate for example a BACnet/IP network from a network based on RS485. So-called routing takes place between the various networks in order to transport information via various layers.

Device name:
Name of the BACnet server to be integrated in the DDC, must be unique.

Device ID
must be unique.

Operating mode
The DDC4000 Central Unit is currently working as a server.





Summary

As early as the plans it should be ascertained who stipulates the required network and BACnet settings. These should be queried and documented using the following list:

Devices	IP address	Mask	Gateway	BACnet network number
1. DDC4200				
2. DDC4200				
...				
BMS				

3.4. control cabinet bus

3.4.1. General

3.4.1.1. Installation

One peculiarity must be observed during installation:

For the BMD and BMA bus modules the electricity supply and the CAN bus can be looped through the modules using a cascade plug.

3.4.1.3. Power supply

Performance data DDC4000

Device	AC	DC
BMD4032	90 mA	100 mA
BMD4064	90 mA	130 mA
BMA4024	280 mA	

24 V DC inverse-polarity protection for all existing

3.4.2. BMA4024

Function summary

All functions of a bus module are summarized under a module of this type.

Below the module several objects and their parameters exist to handle the sub-issues in the bus module.
The module is usually created via planning. This may also take place by logging on such a module to the control cabinet or field bus.
After creating a BMA4024 other objects are installed automatically.

This results in the following object structure:

01 <central unit>
101 <Module> BMA4024
00 <plant> (always 00)
00 <group> (always 00)
P.01 <Object.Index> Pin object for contact 1
P.02 <Object.Index> Pin object for contact 2
...
P.24 <Object.Index> Pin object for contact 24
SY_Module.01 <Object.Index> (general information on the module)

For this a PIN object represents a container in which the contact is defined. For example this switches a contact input to a contact output.

Function description

Module address

The bus module address corresponds to the technical address of its object. Modules on the CAN bus 1 of the central control unit occupy the technical addresses **101** to **116**, according to the bus addresses 1 to 99. The same applies to the modules on CAN bus 2 - they occupy the technical addresses **201** to **216**.

Please note: The issues of the 1st CAN bus are handled by the system object under **// 000/00/00/SY_CAN.01**. **SY_CAN.02** is responsible for the 2nd CAN bus.

Clamp depiction

(Refer also to the description of the **Pin object**.)

All functions of a logical terminal are handled from the corresponding Pin object.
The logical contact connections (logical terminals 1 to 24 (**b1** to **b24** or **Y1** to **Y24**) match the Pin objects **P.01** to **P.24**. The number of the physical contact connection (screw terminal number) does not match a Pin object.
(e.g.: screw terminal number 55 = logical terminal 1 = P.01)

P.xx/Pin type selection determines which function objects are attached to the Pin object.

Analog input **P.xx/CAI.01,** Analog output **P.xx/CAO.01**

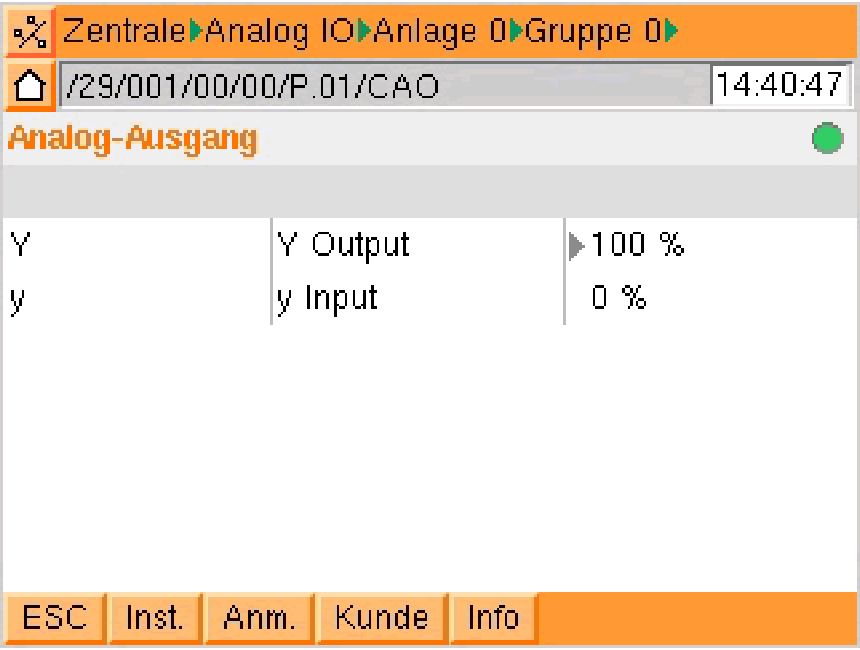
(Refer also to the description of the **Pin object**.)

Each terminal can be configured to an analog input for various sensor types or to an analog output with acknowledgement.

The sensor type is selected from **P.xx/CAI.01/SType**. The selection parameter provides all the options for the bus module. The terminal's sensor value is available via **P.xx/CAI.01/b**.
The unit depends on the sensor type set and the current module firmware. The value is "invalid" for a sensor break or short circuit. Possible values for the BMA4024 (details under "sensor types"):

Sensor type
Value range and unit
0..10V, KP10, Pt100, Pt1000, Ni100, Ni1000 (DIN), Ni1000 (L&G), KP250, ML2

The output value is expected on **P.xx/CAO.01/Y**. Unit is "%".
The returned output value is available on**P.xx/CAO.01/y**, unit is %.



<u>General parameters **SY_Module.01**</u>

(Refer also to the description of the system object**SY_Module**.)

In **SY_Module.01** the general parameters that each module offers are stored.

Peculiarities:

- 899 = Version number of the firmware module
- Active = The module is reachable and has full function. (If the central unit loses contact with the bus module, **SY_Module.01/Active** is set to 0.)
- DubAdr = The module notifies a double address.
- malfunction = The module notifies a malfunction. (If the module detects a malfunction itself sets **SY_Module.01/malfunction** to 1 and provides and malfunction code to **SY_Module.01/Err No**.)
- ErrNo = malfunction code. Warnings and malfunction messages are coded here. The importance can only be queried in the R&S.

Terminal occupancy

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
GND	BUS+	BUS-	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND	0.10V GND
53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78
10V= 50mA	0.10V GND	1 B/Y	2 B/Y	3 B/Y	4 B/Y	5 B/Y	6 B/Y	7 B/Y	8 B/Y	9 B/Y	10 B/Y	11 B/Y	12 B/Y	13 B/Y	14 B/Y	15 B/Y	16 B/Y	17 B/Y	18 B/Y	19 B/Y	20 B/Y	21 B/Y	22 B/Y	23 B/Y	24 B/Y
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
24V AC	0V AC	B1 GND	B2 GND	B3 GND	B4 GND	B5 GND	B6 GND	B7 GND	B8 GND	B9 GND	B10 GND	B11 GND	B12 GND	B13 GND	B14 GND	B15 GND	B16 GND	B17 GND	B18 GND	B19 GND	B20 GND	B21 GND	B22 GND	B23 GND	B24 GND

3.4.3. BMD4032

Function summary

All functions of a bus module are summarized under a module of this type.

Below the module several objects and their parameters exist to handle the sub-issues in the bus module.
The module is usually created via planning. This may also take place by logging on such a module to the control cabinet or field bus.
After creating a BMD other objects are installed automatically.

This results in the following object structure:

01 <central unit>
 101 <Module> BMD
  00 <plant> (always 00)
   00 <group> (always 00)
    P.01 <Object.Index> Pin object for contact 1
    P.02 <Object.Index> Pin object for contact 2
    ...
    P.30 <Object.Index> Pin object for contact 30
    ...
    SY_Module.01 <Object.Index> (general information on the module)

For this a PIN object represents a container in which the contact is defined. For example this switches a contact input to a contact output.

Function description

Module address

The bus module address corresponds to the technical address of its objects. Modules on the CAN bus 1 of the central device occupy the technical addresses **101** to **116**, as per the bus addresses 1 to 16. The same applies to the modules on CAN bus 2 - they occupy the technical addresses **201** to **216**.

Note: The issues of the 1st CAN buses are handled by the system object under**//000/00/00/SY_CAN.01**. **SY_CAN.02** is responsible for the second CAN bus.

Clamp depiction

(Refer also to the description of the **Pin object**.)

All logical terminal functions are handled from the corresponding Pin object.
The logical contact connections (logical terminals) 1 to 32/64 (**k1** to **k32/64** or **K1** to **K32/64**) match the Pin objects **P.01** to **P.32/64**. The number of the physical contact connection (screw terminal number) does not match a Pin object.
(e.g.: screw terminal number 4 = logical terminal 1 = P.01)

P.xx/Pin type selection determines which function objects (sub-objects) are attached to the Pin object. The module object depends on a **CDI** (digital input function) and a **CDO** (digital output function).

<u>Digital input **P.xx/CDI.01**, Digital output **P.xx/CDO.01**</u>

(Refer also to the description of the **Pin object**.)

Each terminal is configurable to the digital input or digital output with acknowledgement.

The digital input value is available from **P.xx/CDI.01/k**. The output value is expected on **P.xx/CDO.01/K**. The returned value from the output is available on **P.xx/CDO.01/k**.

<u>General parameters **SY_Module.01**</u>

(Refer also to the description of the system object**SY_Module**.)

In **SY_Module.01** the general parameters that each module offers are stored.

Peculiarities:

- 899 = Version number of the firmware module
- Active = The module is reachable and has full function. (If the central unit loses contact with the bus module **SY_Module.01/Active** is set to 0.)
- DubAdr = The module notifies a double address.
- malfunction = The module notifies a malfunction. (If the module detects a malfunction itself it sets **SY_Module.01/malfunction** to 1 and provides and malfunction code to **SY_Module.01/Err No**.)
- ErrNo = malfunction code. Warnings and malfunction messages are coded here. The importance can only be queried in the R&S.

Terminal occupancy

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
GND	BUS+	BUS-	K01	K02	K03	K04	K05	K06	K07	K08	K09	K10	K11	K12	K13	K14	K15	K16	K17	K18	K19	K20	K GND	K GND	K GND
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
24V AC	0V AC	K21	K22	K23	K24	K25	K26	K27	K28	K29	K30	K31	K32							K GND	K GND	K GND	K GND	+24V DC	-24V DC

3.4.4. BMD4064

Function summary

All functions of a bus module are summarized under a module of this type.

Below the module several objects and their parameters exist to handle the sub-issues in the bus module.
The module is usually created via planning. This may also take place by logging on such a module to

the control cabinet or field bus.
After creating a BMD other objects are installed automatically.

This results in the following object structure:

01 <central unit>
101 <Module> BMD
00 <plant> (always 00)
00 <group> (always 00)
P.01 <Object.Index> Pin object for contact 1
P.02 <Object.Index> Pin object for contact 2
...
P.30 <Object.Index> Pin object for contact 30
...
SY_Module.01 <Object.Index> (general information on the module)

For this a PIN object represents a container in which the contact is defined. For example this switches a contact input to a contact output.

Function description

Module address

The bus module address corresponds to the technical address of its objects. Modules on the CAN bus 1 of the central device occupy the technical addresses **101** to **116**, as per the bus addresses 1 to 16. The same applies to the modules on CAN bus 2 - they occupy the technical addresses **201** to **216**.

Note: The issues of the 1st CAN buses are handled by the system object under**//000/00/00/SY_CAN.01**. **SY_CAN.02** is responsible for the second CAN bus.

Clamp depiction

(Refer also to the description of the **Pin object**.)

All logical terminal functions are handled from the corresponding Pin object.
The logical contact connections (logical terminals) 1 to 32/64 (**k1** to **k32/64** or **K1** to **K32/64**) match the Pin objects **P.01** to **P.32/64**. The number of the physical contact connection (screw terminal number) does not match a Pin object.
(e.g.: screw terminal number 4 = logical terminal 1 = P.01)

P.xx/Pin type selection determines which function objects (sub-objects) are attached to the Pin object. The module object depends on a **CDI** (digital input function) and a **CDO** (digital output function).

Digital input **P.xx/CDI.01,** Digital output **P.xx/CDO.01**

(Refer also to the description of the **Pin object**.)

Each terminal is configurable to the digital input or digital output with acknowledgement.

The digital input value is available from **P.xx/CDI.01/k**. The output value is expected on **P.xx/CDO.01/K**. The returned value from the output is available on **P.xx/CDO.01/k**.

General parameters **SY_Module.01**

(Refer also to the description of the system object**SY_Module**.)

In **SY_Module.01** the general parameters that each module offers are stored.

Peculiarities:

- 899 = Version number of the firmware module
- Active = The module is reachable and has full function. (If the central unit loses contact with the bus module **SY_Module.01/Active** is set to 0.)
- DubAdr = The module notifies a double address.
- malfunction = The module notifies a malfunction. (If the module detects a malfunction itself it sets **SY_Module.01/malfunction** to 1 and provides and malfunction code to **SY_Module.01/Err No**.)
- ErrNo = malfunction code. Warnings and malfunction messages are coded here. The importance can only be queried in the R&S.

Terminal occupancy

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
GND	BUS+	BUS-	K01	K02	K03	K04	K05	K06	K07	K08	K09	K10	K11	K12	K13	K14	K15	K16	K17	K18	K19	K20	K GND	K GND	K GND
53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78
K39	K40	K41	K42	K43	K44	K45	K46	K47	K48	K49	K50	K51	K52	K53	K54	K55	K56	K57	K58	K59	K60	K61	K62	K63	K64
27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
24V AC	0V AC	K21	K22	K23	K24	K25	K26	K27	K28	K29	K30	K31	K32	K33	K34	K35	K36	K37	K38	K GND	K GND	K GND	K GND	+24V DC	-24V DC

3.4.5. SBM51_04

The module object **MO_SBM51_04** is a special type of object **MO_SBM51**. It is produced when sub-group **/04** is assigned to object **MO_SBM51**.

Special behavior for malfunctions

If the module detects a malfunction itself sets **SY_Module.01/malfunction** to 1 and provides and malfunction code "1" to **SY_Module.01/Err No**.
If the central unit loses contact with the bus module **SY_Module.01/Active** is set to 0.

Logical address structure

Technical address

Example:

103 SBM51_04

00 plant

00group

SY_SBM51.01 SY_SBM51

Parameter for bus release and cyclical reading

...

SY_Module.01 SY_Module

...

b1 plant

00group

H004.01 H004

Parameters for counting medium, device query

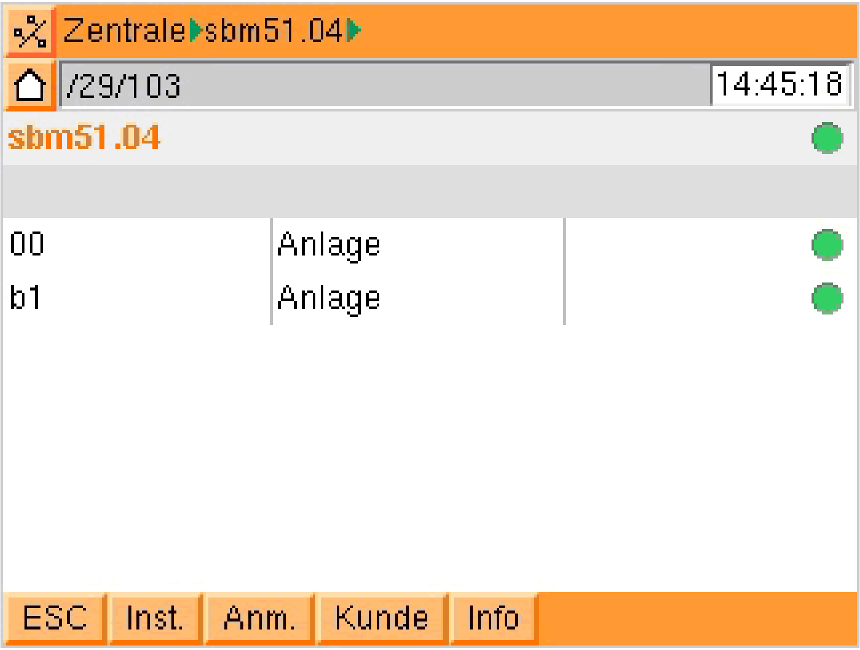
H004.02 H004

Para

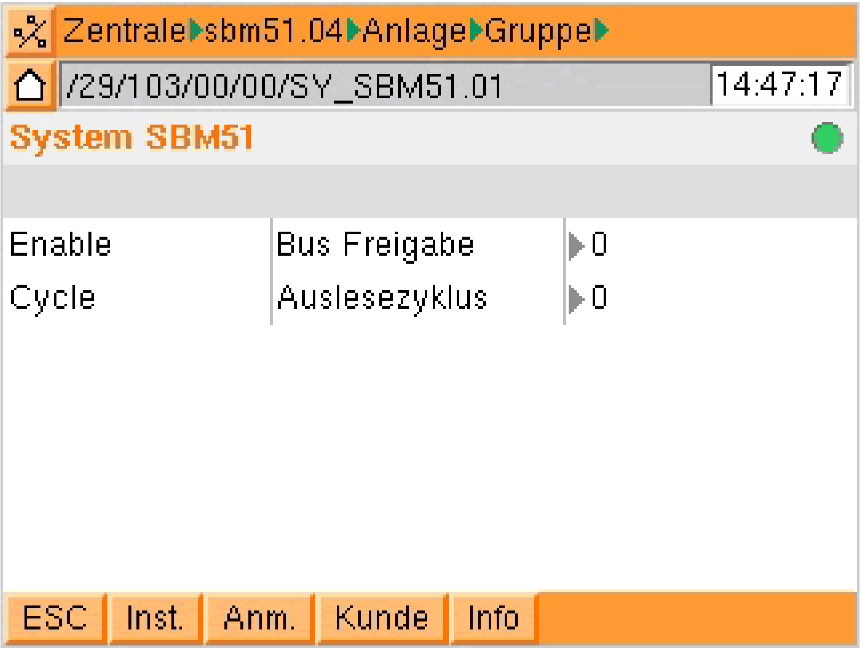
...

H004.32 H004

Para



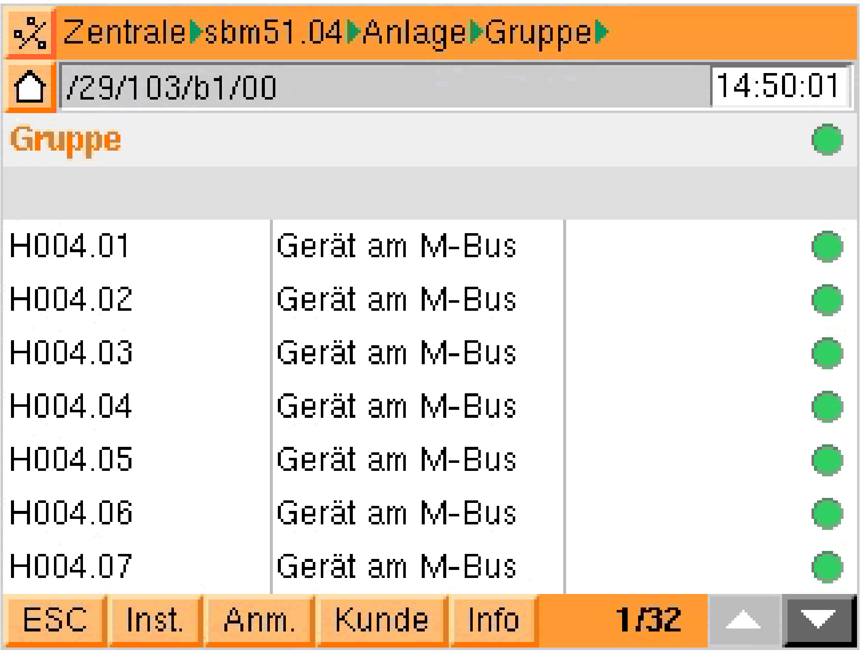
Dialing SBM51



Configuring the SBM51

System object **SY_SBM51.01** summarizes the special requests of the SBM51 family. Bus release and cycle time are placed here.

Each **H004** is responsible for precisely one of the maximum 32 M bus counters.
The counter type can be stipulated in H004. This stipulation creates the parameters that belong to the connected counters etc.



Third party devices on the SBM51 are fond in Appendix "b1". In this example H004 for counter.

System object **SY_Module.01** is responsible for a module's general issues. For details refer to the description of the **SY_Module**.

technical bus address

<u>Module bus address on the SBM bus</u>

//xxx

The bus module address corresponds to the technical address of its objects. Modules on the CAN bus 1 of the central device occupy the technical addresses **101** to **116**, as per the bus addresses 1 to 99. The same applies to the modules on CAN bus 2 - they occupy the technical addresses **201** to **216**.

Note: The issues of the 1st CAN buses are handled by the system object under**//000/00/00/SY_CAN.01**. **SY_CAN.02** is responsible for the second CAN bus.

<u>Selection of specific SBM51</u>

//xxx/00/00/SY_SBM51.01/Config

Module SBM51/04 is selected. Another device can be selected. This should be done carefully as it is not possible to check for an appropriate SBM device! The SBM device itself only supplies the information that it is a SBM51 but not whether it is a SBM51/04 or another device.

<u>M bus counter bus address</u>

//xxx/b1/00/H004.yy

32 gateway objects type H004 are created as a SBM51/04 can process up to 32 M bus counters. Each gateway object is responsible for one M bus counter.
The bus address is expressed in the gateway object index. The SBM51/04 only supports the M bus counters with addresses from 1 to 32 although the M bus knows addresses from 1 to 250.

Function description of object //xxx/00/00/SY_SBM51.01

<u>Special SBM51 parameter: **SY_SBM51.01**</u>

In **SY_SBM51.01** all parameters are stored that are important for the SBM51 as a whole but are too special for the **SY_Module**.

- **Config** = Select the specific SBM51 for which the module object is responsible.
  The selection is now on SMB51/04.
- **Enable** = Bus release
- **Cycle** = Bus cycle time. 0 = 24h, 1 = 2min.

(Compare description of the system object**SY_SBM51**.)

Function description of the device objects //xxx/b1/00/H004.yy

M bus counter with bus address yy: **//xxx/b1/00/H004.yy**

Each object is responsible for exactly one M bus counter.

- **Config** = Selection of consumption medium.
  After selection a second Config parameter is visible from the following one.
- **Config EL** = Selection of an electricity counter from a list.
  Parameter becomes visible if the medium "electricity" is selected with Config.
- **Config WM** = Selection of a heat volume counter from a list.
  Parameter becomes visible if the medium "heat" is selected with Config.
- **Config WA** = Selection of a water counter from a list.
  Parameter becomes visible if the medium "water" is selected with Config.

(Compare description of gateway object **H004**.)

Function summary

Jedes installierte Objekt ist für genau ein Gerät am M-Bus zuständig. Der Objekt-Index der technischen Adresse ist mit der Busadresse am M-Bus identisch. Über den Parameter **Config** wird die Geräte-Klasse des konkreten M-Bus-Zählers ausgewählt, woraufhin ein zweiter Config-Parameter "**ConfigYY**" installiert wird, über den der Geräte-Typ ausgewählt wird. Aufgrund beider Auswahlen wird ein passendes Subobjekt installiert. ConfigYY steht für **ConfigE**L, **ConfigWA** oder **ConfigWM**. Siehe dort. Die Subobjekte CD_WM und CD_WA stehen für die "**Generischen Parameter**" der Geräte-Klasse, das sind die Parameter, die wirklich jeder Wäremzähler bzw. jeder Wasserzähler bieten sollte. Alle anderen Subobjekte haben mehr Parameter als nur die generischen.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
Active	**aktiv** Device active	actual value boolean	--	--	0	--
Anfrage	Counter inquiry	set point boolean	--	--	0	--
Config	**Medium** Counting medium	set point multistate	--	5	0	value,text 0,none 1,Electricity counter 2,Heat counter 3,Water counter 4,DDC3000-Menu
ConfigEL	**Elt-Typ** Elt-Counter type	set point multistate	--	2	0	value,text 0,Standard 1,Standard-Maximum

No.	name of parameter	parameter typ	min	max	init	unit
ConfigWA	**H²O-Typ** Water counter type	set point multistate	--	3	0	value,text 0,Standard 1,Standard-Maximum 2,Allmeas ISWZ
ConfigWM	**WMZ-Typ** Heat counter type	set point multistate	--	2	0	value,text 0,Standard 1,Standard-Maximum

3.5. Field bus

3.5.1. General

3.5.2. Modules

The field bus modules of the DDC3000 system are integrated step by step into the DDC4000 system. They are subject to the same connection conditions and wiring guidelines. These modules only "understand" an address assignment up to 63.
The circular or intranet state which modules have already been integrated.

4. Software structure

4.1. General, background

4.1.1. Addressing

Address structure

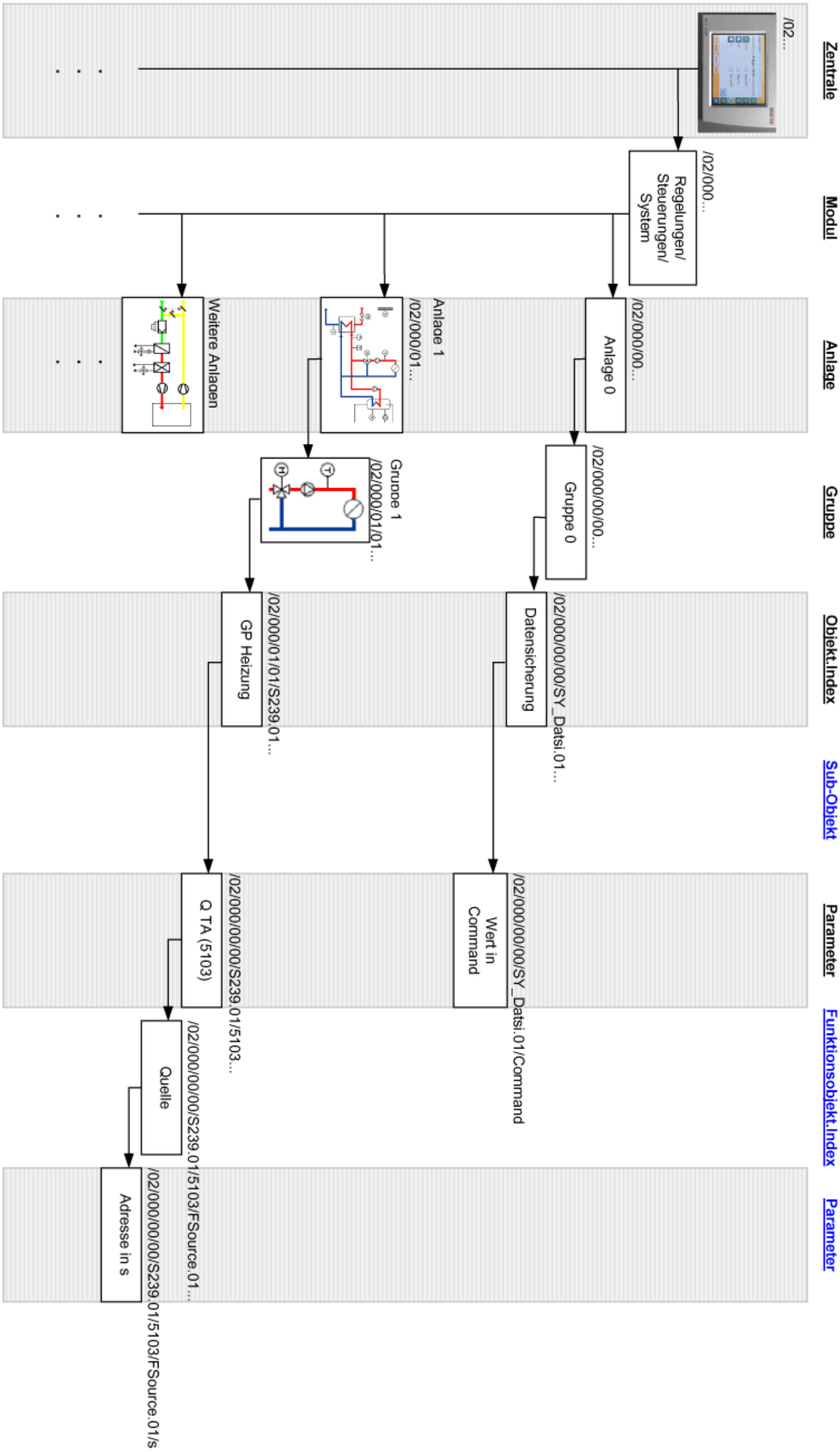
In the DDC4000 system a technical address is used to structure and administrate data. This is based on the structure for administrating technical plants (heating, cooling and control units) and their individual components. It represents logical and physical units and their dependencies.

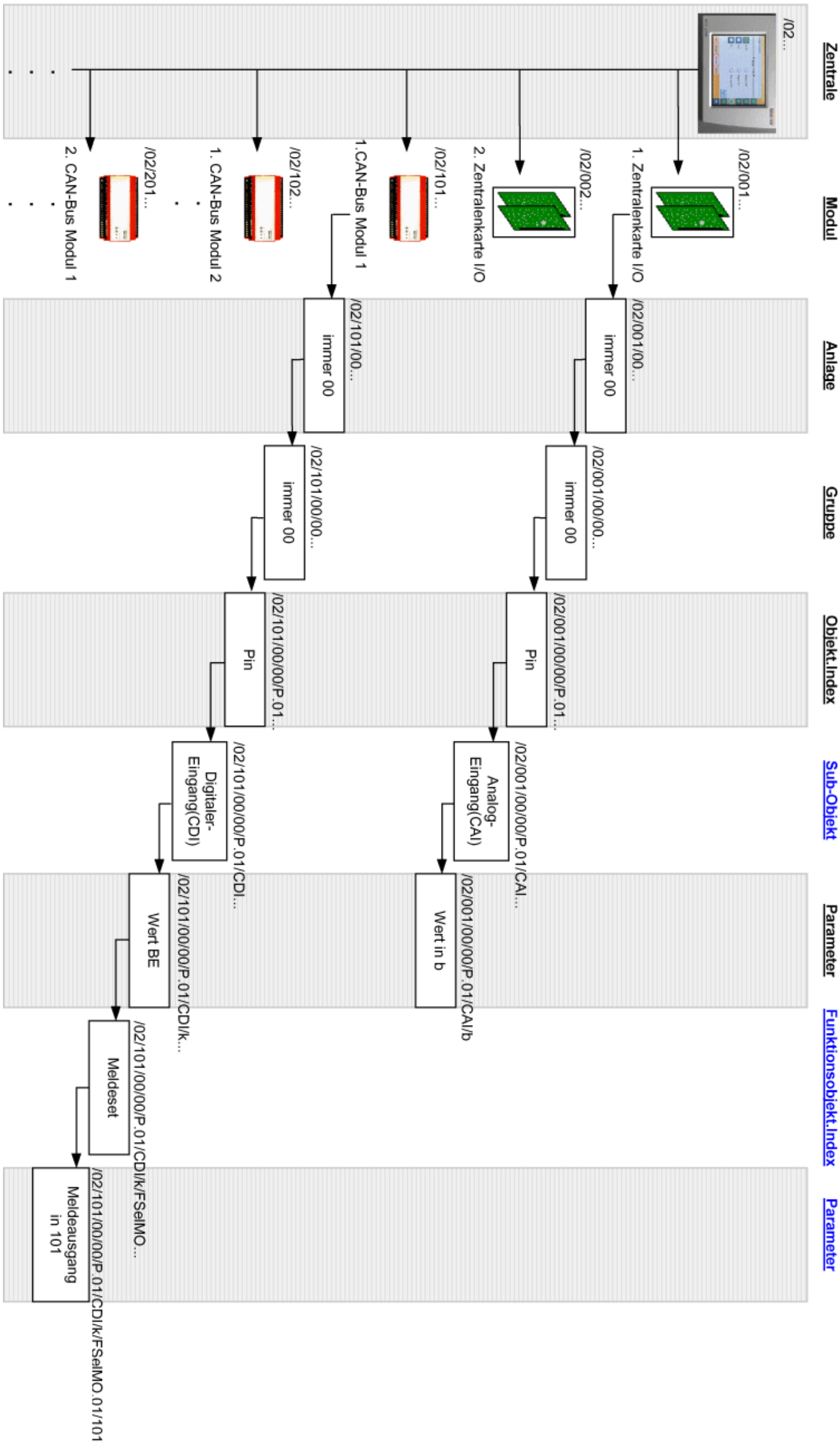
The functions in the DDC **central unit** are strictly classified by **plants**. This may for example be a heating plant with 2 heating circuits (stat. heating circuit, WWB). Within one plant parts may be grouped according to logically related functions. One such **group** for example is a heating circuit with the pump, valve and temperature sensors. The function of such a plant element within the group is described by **objects**. An object usually comprises input parameters, function and output parameters.

A technical address in the DDC4000 system usually has the following structure:
(Address components marked in blue are not available for parameters.)

/ Zentrale / Modul / Anlage / Gruppe / Objekt.Index / Sub-Objekt / Parameter / Funktionsobjekt.Index / Parameter

The slash "/" is always used as a separator in the address.


Zentrale
Modul
Anlage
Gruppe
Objekt.Index
Sub-Objekt
Parameter
Funktionsobjekt.Index
Parameter
/02...
/02/000...
Regelungen/
Steuerungen/
System
/02/000/00...
Anlage 0
Anlage 1
/02/000/01...
Weitere Anlagen
/02/000/00/00...
Gruppe 0
Gruppe 1
/02/000/01/01...
/02/000/00/00/SY_Datsi.01...
Datensicherung
/02/000/01/01/S239.01...
GP Heizung
/02/000/00/00/SY_Datsi.01/Command
Wert in
Command
/02/000/00/00/S239.01/5103...
Q TA (5103)
/02/000/00/00/S239.01/5103/FSource.01...
Quelle
/02/000/00/00/S239.01/5103/FSource.01/s
Adresse in s



Zentrale
Modul
Anlage
Gruppe
Objekt.Index
Sub-Objekt
Parameter
Funktionsobjekt.Index
Parameter
/02...
/02/001...
1. Zentralenkarte I/O
/02/002...
2. Zentralenkarte I/O
/02/101...
1.CAN-Bus Modul 1
/02/102...
1. CAN-Bus Modul 2
/02/201...
2. CAN-Bus Modul 1
/02/001/00...
immer 00
/02/001/00/00...
immer 00
/02/001/00/00/P.01...
Pin
/02/001/00/00/P.01/CAI...
Analog-Eingang(CAI)
/02/001/00/00/P.01/CAI/b
Wert in b
/02/101/00...
immer 00
/02/101/00/00...
immer 00
/02/101/00/00/P.01...
Pin
/02/101/00/00/P.01/CDI...
Digitaler-Eingang(CDI)
/02/101/00/00/P.01/CDI/k...
Wert BE
/02/101/00/00/P.01/CDI/k/FSelMO...
Meldeset
/02/101/00/00/P.01/CDI/k/FSelMO.01/101
Meldeausgang in 101

More detailed explanation

Address element <central unit>
The central unit is the first element in the technical address. It can have a value in the range between 1 and 99. If this address element is not stated the own central unit is addressed. The "/" separator is retained before the individual central unit and module address elements. This results in the address: "//Module"

Value	Notes
01...99	If your own central device is to be address "//" is enough for central addressing

Address element <Module>
The second address element in the technical address is the module address. There are various value ranges for this element and their meaning is shown in the following table. Each module has a unique number within its central device.

Value	Notes
000	Address the central unit module DDC4000 itself (controls, regulators, plant information)
001...099	internal modules e.g. I/O card 1 = 001
101...199	Module addresses for the 1st CAN bus; 101...116 for S-Bus; 101...163 (future plans 101...199) for F-Bus
201...299	Module addresses for the 2nd CAN bus; 201..0.216 for S-Bus; 201..0.263 (future plans 201..0.299) for F-Bus

Address element <plant>
The plant is the third element in the technical address. It can have a value in the range between 0 and 99.

Value	Notes
00	Used to transfer to the DDC4000's plant information or to achieve lower hierarchy addresses.
01...99	Stating the plants within the module.

Address element <Group>
The group address is an organizational criterion within one module. It can be used in any way. Values between 0 and 99 are permitted here. The number of a group is unique within a module. Each module has as standard the group with number 00.

Values	Notes
00...99	Free order unit (containers). It contains one or more objects.

Address element <Object.Index>
The unique address of an object is combined out of the address of the object type and the object index. The address element "object" describes the object type. The object type can be available repeatedly in one group. The uniqueness of the object within the group is guaranteed by the object

index "Index". The object index always follows the object, separated by a point.
A difference is made between basic objects, hardware objects, software objects and system objects. The differentiation is made by the first letter of the object type:

Value	Notes
L, M, P,S,T...	Basic objects lamp, marker, pins, switches, timers. Further characters may follow after the relevant starting letter. In any case the term ends with a period followed by a two digit index number (01...99).
Hxxx.yy	Hardware object. "H" code followed by a three-digit number (x) and subsequent index code (y).
Sxxx.yy	Software object. "S" code followed by a three-digit number (x) and subsequent index code (y).
SY_...	system object. Other characters my follow after the "SY_" code. In any case the term ends with a period followed by a two digit index number (01...99).

Address element <Sub-object>
This address element is only provided for certain objects. It is integrated under the object.
The sub-object is used to specify objects and is available only once in an object.
It contains no index.

An example for an object that provides a sub-object, is the basic object "PIN". This object implements access to the parameters, e.g. a connection terminal for a BMD. In this, for example, a contact connection can be set as an input or output.

Please note:
A "screw number" (i.e. a number of the physical contact connection), e.g. on a BMD must not be the same as the PIN number. A PIN is not a physical but rather a logical contact connection.
Example: Screw 4 is PIN no. 1 because screws 1 to 3 are for the CAN bus.

The following table lists examples of sub-objects.

Value	Notes
CAI	Analog input
CAO	Analog output
CDI	Digital input
CDO	Digital output

Address element <Parameter>
The parameter is a property of an object or sub-object. An object or sub-object comprises one or more parameters whose values influence the behavior of the object/sub-object. For this the parameter must be unique in its object/sub-object. The parameter is an alphanumeric chain of characters (e.g. "5891", "b", or "TAUdown")

Address element <Function object.Index>
Parameters may contain function objects that change them or extend their function. A function object may occur several times under a parameter. The unique nature of the function object within the parameter is guaranteed by an index. So for example you can attach to parameter "Source outside

temperature" (5103) in the basic heating program a "Source" (FSource) function object in order to transfer the source value to parameter 5103.

Address element <parameter> of the function object
The parameter is a property of the function object. A function object is comprised of one or more parameters whose value influence the behavior of the function object. For this the parameter must be unique in its function object. The parameter is an alphanumeric chain of characters (e.g. "s")

4.1.1.1. Addressing examples

Example 1:
access to parameter "command" e.g. for backing up data

Central unit
For central unit 01:
/**01**

Module
Access to data backup is provided in the DDC4000 system information:
/01/**000**

Plant
Access to the data backup is through plant 00:
/01/000/**00**

Group
Access to data backup is through group 00:
/01/000/00/**00**

Object.Index
Access to data backup is guaranteed by object SY_Datsi:
/01/000/00/00/**SY_Datsi.01**

Sub-object
No sub-object is required for access to the "command" parameter. Therefore no sub-object is used.

Parameters
Access to the "command" parameter:
/01/000/00/00/SY_Datsi.01/**Command**

Function object.Index
A function object is not required for access to the "command" parameter

Parameter (of the function object)
A function object parameter is not required for access to the "command" parameter

Example 2:
Access to the "s" parameter as the source address for a "Q TO" parameter in basic heating program

Central unit
For central unit 02:
/**02**

Module
Access to the basic heating program is by regulating/controlling the DDC4000 and thus via Module 000:
/02/**000**

Plant
Access to the basic heating program is via the selection of for example a heating plant (01):
/02/000/**01**

Group
Access to the basic heating program is via the selection of for example a group control (01):
/02/000/01/**01**

Object.Index
Access to the basic heating program :
/02/000/01/01/**S239.01**

Sub-object
The source is located in the function object of the "Q TO" parameter in the basic heating program object. Therefore no sub-object is addressed.

Parameters
Access to the "Q TO" parameter of object S239.01 (Basic heating program):
/02/000/01/01/S239.01/**5103**

Function object.Index
A function object that extends or changes the properties or includes additional functions is attached to this "Q TO" parameter (e.g. stipulating a source for the value in the "Q TO" parameter):
/02/000/01/01/S239.01/5103/**FSource.01**

Parameter (of the function object)
You can stipulate the properties of the function object etc. with these parameters. In the example parameter "s" is access and this contains the source address of the analog value :
/02/000/01/01/S239.01/5103/FSource.01/**s**

Example 3:
Access to a "b" parameter in the PIN object as analog input from the DDC4000 analog card

Central unit
For central unit 03:
/**03**

Module
Access to the analog card of the DDC4000 is via the module address 001:
/03/**001**

Plant
The analog card itself has no plants so plant 0 is selected (access to the PINs always via plant 0):
/03/001/**00**

Group
The analog card itself has no group so group 0 is selected (access to the PINs always via group 0):
/03/001/00/**00**

Object.Index
Access to the PIN object and therefore to the logical contact connection:
/03/001/00/00/**P.01**

Sub-object
The PIN object contains a sub-object. This PIN is therefore defines as an analog input (CAI):
/03/001/00/00/P.01/**CAI**

Parameters
Access to the "b" parameter where the analog value is located:
/03/001/00/00/P.01/CAI/**b**

Function object.Index
A function object is not required for access to the "b" parameter

Parameter (of the function object)
A function object parameter is not required for access to the "b" parameter

Example 4:
Access to the "101" parameter (message output) of the function object "message set" of a PIN on e.g. a BMD4032

Central unit
For central unit 04:
/**04**

Module
Access to the BMD 4032 that is installed on the 1st CAN bus and as the first module:
/04/**101**

Plant
A BMD itself has no plant so plant 0 is selected (access to the PINs always via plant 0):
/04/101/**00**

Group
A BMD itself has no group so group 0 is selected (access to the PINs always via group 0):
/04/101/00/**00**

Object.Index
Access to the PIN object and therefore to the logical contact connection (e.g. pin 1):
/04/101/00/00/**P.01**

Sub-object
The pin object contains a sub-object. This pin is therefore defined as a digital input (CAI):
/04/101/00/00/P.01/**CDI**

Parameters
Access to the parameter "k" in which the digital logical contact status is displayed:
/04/101/00/00/P.01/CDI/**k**

Function object.Index
A function object is attached to this "k" parameter that extends or changes the properties or contains additional function (e.g. outputs a message in the DDC4000 if the binary value changes from "0" to "1"):
/04/101/00/00/P.01/CDI/k/**FSelMO.01**

Parameter (of the function object)
You can stipulate for example the properties of the function object with these parameters. In the example parameter "101" is accessed and this contains the source address of the analog value:
/04/101/00/00/P.01/CDI/k/FSelMO.01/**101**

4.1.2. Parameter types

For parameterizing each object has a certain number of parameters. These parameters are shown in tabular form. The types used are described in greater detail here.

Can the parameters be deleted?

In many cases a function is switched to inactive in this way.

Source or not?

A source can be linked to each parameter in the DDC4000. The value of the source then replaces the parameter value.
In line with the importance some typical parameters always require source parameterizing. The names of these are marked with the supplement "source" or "Q". This should make locating them easier.

Summary

Integer
Floating comma digit
Binary value (Boolean)
Multistate
Selection list
String
Reference

Integer

The integer type has a maximum range of -2,147,483,648 to 2,147,483,647. As this size can not be achieved in practice the value "infinity" is given in the table if this value range is not restricted.
A typical example of the integer type is operating hours. These are only recorded in full hours.
Example:

Par.No	Parameter name	Description	Parameter type	Min	Max	Init	Unit
9	**Bh** Operating hours	Operating hours counter level 1 and/or level 2	Set point Integer	0	+infinity	0	h

Explanation of statements:

Par.No
9

Parameter number: This number is used to address the parameter within the object. This number is not unique in the whole system!

Parameter name
Bh
Bh ges.

Parameter name: A difference is made between basic text (here "Bh") and default text (here "operating hours"). The basic text can be a maximum of 8 characters and can be used for addressing. The default text is 15 characters long and provides a longer description. This description can be adapted to the customer's wishes.

Description
set point/actual value for counting operating hours level 1 and/or level 2

The description gives information on the importance and use of the parameter as well as any peculiarities to be observed.

Parameter type
Set point
Integer

Two pieces of information are included in the "parameter type". In the top line the term " set point" or "actual value" is found. This states whether it is a stipulated (target) value or a calculated (actual) value. As a result actual values can not be changed directly by the user.
The second line contains the parameter type, e.g. "integer" or "string".

Min
0

Min states the minimum value permitted (here 0). Sometimes this states the limitation from the DDC's technological perspective and thus not every permitted value is always appropriate.

Max

+infinity

Max state the maximum permitted value (here +infinity = 2,147,483,647 which corresponds to 245,000 years) that is permitted for this parameter.

Init
0

The value stated under "Init" matches the default for the first installation of the relevant object. Here the "0" means that the operating hours counter starts to count at "0" if it is not overwritten with a different value.

Unit
h

The unit is only stated when this is appropriate. In this case "h" stands for "hours". This document also includes a list of units.

Float

The float (or floating point) type has a maximum range of -3.402823466E38 to 3.402823466E38 (E38 stands for 10 to the power of 38 or seen in a different way the comma is shifted 38 positions to the right). As this size can not be achieved in practice the value "infinity" is given in the table if this value range is not restricted.
A typical example of the float type is outside temperature. This is only recorded in °C with 3 characters after the decimal point (as for all floating numbers) and is indicated with one character after the point (varies with parameter).
Here a fictitious example:

Par.No	Parameter name	Description	Parameter type	Min	Max	Init	Unit
5103	**TO** TO	Outside temperature	Actual value Floating comma number	-999.000	999.000	0.000	---

For general information on the states, refer to integer (above).

Binary value / Boolean

A binary value can only have the value 0 "false" or 1 "true". The corresponding meaning can be very different and must be taken from the documentation.

Multistate

A multistate value can depict several statuses in a parameter. So for example a controller can have the status ON, OFF or AUTO.

Par.No	Parameter name	Description	Parameter type	Min	Max	Init	Unit
5175	Source remote control	--	Actual value Status value	--	4	1	BACnet,DDC_No.,Text 4, 0, OFF 2, 1, day 1, 9, Auto 3, 35, night

The information on the status value are more complex and so they are worth handling in greater detail:

The **"unit"** column lists a small table that shows the potential statuses. Here the first column ("BACnet" title" states the numbering of the statuses as used in BACnet. The BACnet standard prescribes the numbering of the available statuses from 1 consecutively to n (number of statuses). This does not match the approach at Kieback&Peter.

The Kieback&Peter numbering is found in the second column (title "DDC no."). For Kieback&Peter numbering the same numbers always have the same meaning, which can mean that the number 0,1 and 9 (for OFF, ON, AUTO) are used.

The importance is to be read in the third column (status text).

The table is sorted by the Kieback&Peter numbering.

The **"Init"** column states the preset status. This is **BACnet numbering**!

The **"Max"** column indicates the highest BACnet index.

Selection list

A selection list enables you to choose from several statuses for a parameter.
Example:

Par.No	Parameter name	Description	Parameter type	Min	Max	Init	Unit
5127	Uncontrolled condition	--	Set point pull list	--	--	0	Selection list BitPos,Text 0, YL1 1, YL2 2, YL3 3, YL4

For this the parameter is viewed in its binary depiction form. A bit (bit position) is used for each status.

In this example this means when YL2 and YL are to be selected:
binary: 0110 = decimal: 6

If YL1, YL2 and YL3 are to be selected this looks as follows:
binary: 0111 = decimal: 7

If you are unfamiliar with this depiction of numbers the Windows calculator (found under accessories) may help as long as it is switched to "scientific".

The default setting (column **"Init"**) "0" means that no status is selected.

String

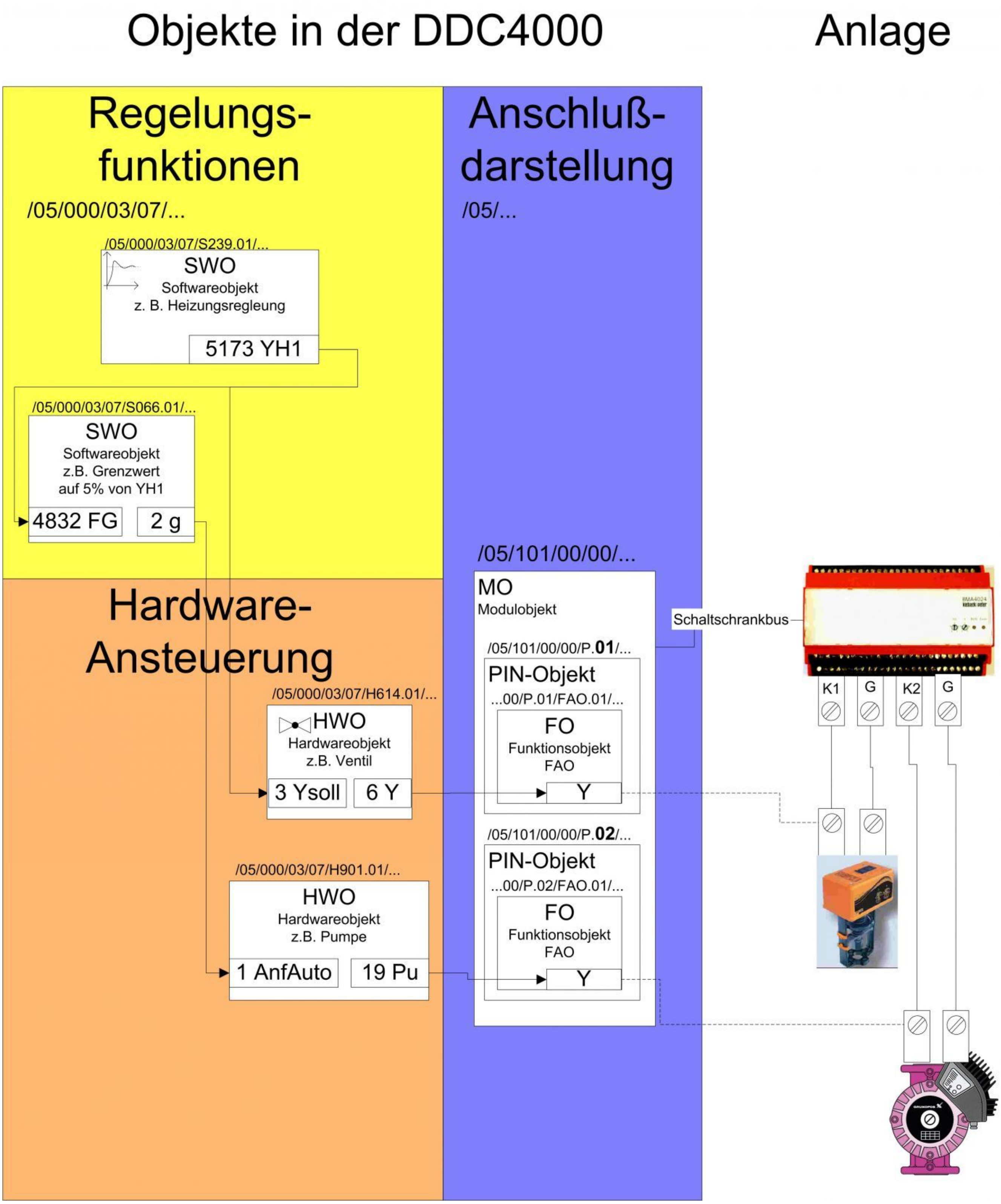
The "string" parameter type is always used when none of the other types offer adequate options. So this is used for telephone numbers (e.g. "+49-30-60095-0") or IP addresses (e.g. 192.168.0.1).

Source/Reference

In a reference parameter type addresses that point to other parameters from where the value is to be obtained are entered.

4.1.3. Object principles

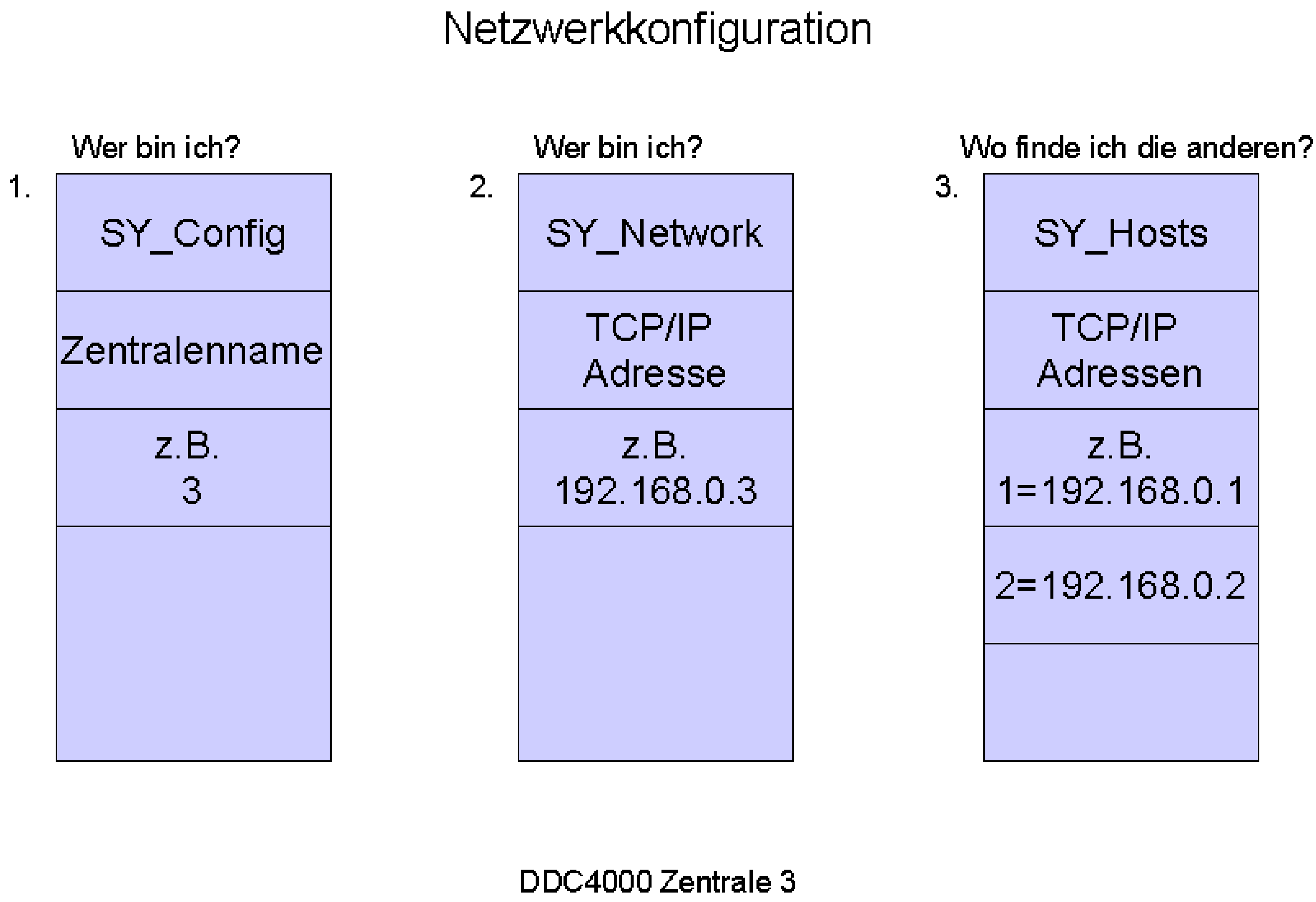
The following image presents the key objects with a potential type of connection and use.



On all inputs analog and binary sources are parameterized. These inputs initiate a regulation in the software objects; links are processed in the hardware objects. The output signals are then sent to the terminals via PIN objects.

4.2. Basic functions

4.2.1. central unit address



4.2.2. Time administration

Please refer to the user manual for entering and operating the time control, the description is written here from the object perspective.

4.2.2.1. S118 Schedule

Activation

Function summary

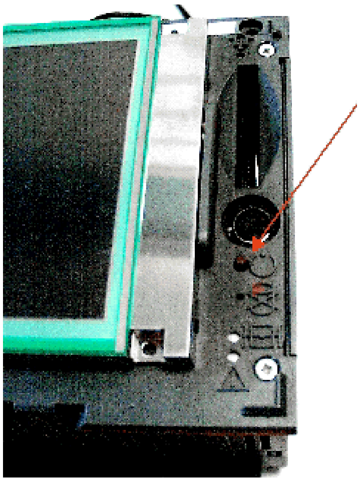
Mit Hilfe des Software-Objektes „SO_ScheduleSE“ ist es möglich, sowohl täglich wiederkehrende Ereignisse (Wochenprogramme) als auch einmalige Zeitpunkte (Sondernutzungszeiten) zu beschreiben.

Der Zeitplan besitzt eine Schaltzeittabelle, die die Schaltzeiten aller Ausgänge (z.B. Regler, Schalter) verwaltet. Ein Eintrag in dieser Liste besteht aus dem Wochentag („Mo“ - „So“), der Uhrzeit im Format hh:mm (00:00 – 23:59), einer Liste von Ausgängen die dieser Eintrag beeinflussen soll, sowie den Wert, den jeder in der Liste befindliche Ausgang annehmen soll. Die einzelnen Schaltzeitpunkte können jedoch nur durch eine Bedienoberfläche angezeigt, editiert oder gelöscht werden.

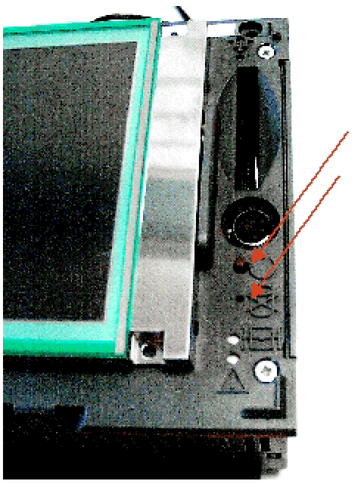
4.2.3. Behind the front cover

Short description of the elements behind the DDC4200 front cover

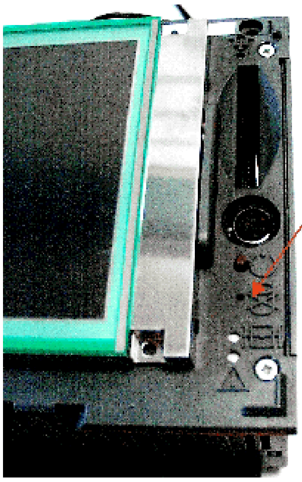
- Zugriffe auf Compact-Flash-Karten
- solange diese LED blinkt, wird z.B. eine Datensicherung oder ein Update durchgeführt



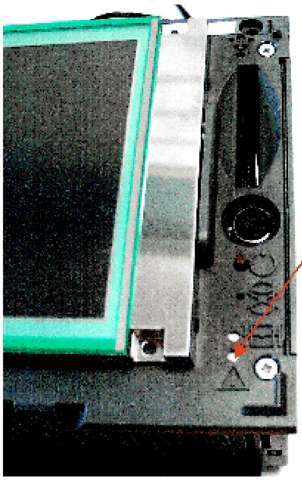
- Warmstart
- Stift betätigen



- Kaltstart:
- 1. Taster im Loch betätigen
- 2. kurz danach, gleichzeitig Warmstart-Taster betätigen
- 3. Taster im Loch loslassen
- 4. Warmstart-Taster nach 3 Sek. loslassen
- Achtung! Daten können verloren gehen!
- Als Bestätigung ist ein langer Ton



- Reset
- Die DDC-Zentrale wird unkontrolliert herunter gefahren
- Achtung! Daten können verloren gehen!



- Stand August 2004:
- Bootloader läuft (LEDs blinken
  - Danach sind sie unkontrolliert an oder aus

4.2.4. Units

Summary of usable units in the DDC

No.	unit	description
0	m²	Quadratmeter [m2]
1	ft²	square-feet [ft2]
2	mA	Milliampere [mA]
3	A	Ampere [A]
4	Ω	Ohm
5	V	Volt (V)
6	kV	Kilovolt (kV)
7	MV	Megavolt (MV)
8	VA	Volt Ampere (VA)
9	kVA	Kilovolt Ampere (kVA)
10	MVA	Megavolt amperes
11	VA Reac	Volt amperes reactive
12	KA Reac	Kilovolt amperes reactive
13	MVA Reac	Megavolt ampere reactive
14	cos φ	Degrees phase (Phasenverschiebung)
16	J	Joule (J)
17	kJ	Kilojoule (KJ)
18	Wh	Watt-Stunden (Wh)
19	kWh	Kilowatt-Stunden (KWh)
20	BTU	BTUs
22	ton h	Tonnen-Stunden
23	J/kg dry air	Joule pro Kg tockener Luft
24	BTU/p dry air	btu per pound dry air
25	1/h	Zyklen pro Stunde
26	1/min	Zyklen pro Minute
27	Hz	Hertz (Hz)
28	g H²O/kg	Gramm Wasser pro Kilogramm trockener Luft
29	%	Relative Feuchte (%rF)

No.	unit	description
30	mm	Millimeter (mm)
31	m	Meter
32	in	Inches
33	ft	Feet
34	W/ft²	Watts per square foot
35	W/m²	Watt pro Quadratmeter
36	lm	Lumen (Lichtfluss)
38	Foot Candels	Microsoft Bookshelf (American Heritage Dictionary of the English Language) defines foot-candle as a unit of measure of the intensity of light falling on a surface, equal to one lumen per square foot.
39	kg	Kilogramm
40	lbs	Pounds mass
41	t	Tonen
42	kg/s	Kilogramm pro Sekunde
43	kg/min	Kilogramm pro Minute
44	kg/h	Kilogramm pro Stunde
45	lbs/min	Pounds mass per minute
46	lbs/h	Pounds mass per hour
47	W	Watt (W)
48	kW	Kilowatt (KW)
49	MW	Megawatt (MW)
50	BTU/h	Btu per hour
51	HP	Pferdest en (PS) (HP)
52	t	Tons refrigeration
53	Pa	Pascal (Pa)
54	kPa	Kilo-Pascal (kPa)
55	bar	Bar
56	lbs/in²	Pounds force per square inch
57	mm H²O	Zentimeter Wassers e
58	in H²O	Inches of Water
59	mm Hg	Millimeter Quecksilbers e

No.	unit	description
60	cm Hg	Zentimeter Quecksilbers e
61	in Hg	Inches of mercury
62	°C	Grad Celsius
63	K	Grad Kelvin
64	°F	Degrees Fahrenheit
65	DDC	Gradtagzahl
66	DDF	Degree days Fahrenheit
67	Y	Jahre
68	M	Monate
69	W	Wochen
70	d	Tage
71	h	Stunden
72	min	Minuten
73	s	Sekunden
74	m/s	Meter pro Sekunde
75	km/h	Kilometer pro Stunde
76	ft/s	feet per second
77	ft/min	Feet per minute
78	mph	Miles per hour
79	ft^3	Cubic feet
80	m^3	Kubikmeter
81	Imp. gal	Imperial Gallons equal to 4 quarts (4.546 liters).
82	l	Liter
83	US gal	United States Gallons equal to 4 quarts (3.785 liters).
84	ft^3/min	Cubic feet per minute
85	m^3/s	Kubik-Meter pro Sekunde
86	Imp. gal/min	Imperial gallons per minute
87	l/s	Liter pro Sekunde
88	l/min	Liter pro Minute
89	US gal/Min	US Gallons per minute

No.	unit	description
90	°	Winkel in Grad
91	°C/h	Grad Celsius pro Stunde
92	°C/min	Grad Celsius pro Minute
93	°F/h	Degrees Fahrenheit per hour
94	°F/min	Degrees Fahrenheit per minute
96	ppm	Parts per Million
97	ppb	Parts per Billion (Milliarde)
98	%	Prozent
99	%/s	Prozent pro Sekunde
100	1/min	pro Minute
101	1/s	pro Sekunde
102	psi/°F	psi per degree Fahrenheit
103	rad	Radiant (rad)
104	1/min	
115	in²	Square inches [inch2]
116	cm²	Quadratzentimeter [cm2]
117	BTU/lbs	btu per pound
118	cm	Zentimeter
119	lbs/s	Pounds mass per second
120	Δ°F	Delta degrees Fahrenheit
121	Δ°K	Temperaturdifferenz in Kelvin
122	kΩ	Kiloohm (kOhm)
123	MΩ	Mega Ohm (MOhm)
124	mV	Millivolt (mV)
125	kJ/kg	Kilojoule pro Kilogramm (KJ/Kg)
126	MJ	Mega-Joule (MJ)
127	J/K	Joule pro Grad Kelvin (J/K)
128	J/kgK	Joule pro Kilogramm Grad Fahrenheit (J/KgF)
129	kHz	Kilohertz (KHz)
130	MHz	Megaherz (MHz)

No.	unit	description
131	1/h	Pro Stunde
132	mW	Milliwatt (mW)
133	hPa	Hecto-Pascal (hPa)
134	mbar	Milli-Bar (mBar)
135	m^3/h	Kubik-Meter pro Stunde
136	l/h	Liter pro Stunde
137	kWh/m^2	Kilowattstunden pro Quadratmeter
138	kWh/ft^2	Kilowatt hours per square foot
139	MJ/m^2	Megajoule pro Quadratmeter
140	MJ/ft^2	Megajoules per square foot
141	$W/(m^2\ °K)$	Watts per square meter degree Kelvin
142	ft^3/s	Cubic feet per second
143	%obs/ft	Unit percent obstruction per foot
144	%obs/m	Percent obstruction per meter
145	mΩ	Milli-Ohm
146	MWh	Megawatt-Stunden
147	kBTU	Kilo BTUs
148	MBTU	Mega BTUs
149	kJ/kg (dry air)	Kilojoule pro Kilogram trockener Luft
150	MJ/kg (dry air)	Megajoule pro Kilogram trockener Luft
151	kJ/K	Kilojoule pro Kelvin
152	MJ/K	Megajoule pro Kelvin
153	N	Newton
154	g/s	Gramm pro Sekunde
155	g/min	Gram pro Minute
156	t/h	Tonnen pro Stunde
157	kBTUs/h	Kilo BTUs per hour
158	1/100s	Hundertstel einer Sekunde
159	ms	Milisekunden
160	Nm	Newton-Meter

No.	unit	description
161	mm/s	Milimeter pro Sekunde
162	mm/min	Milimeter pro Sekunde
163	m/min	Meter pro Minute
164	m/h	Meter pro Stunde
165	m^3/min	Kubikmeter pro Minute
166	m/s^2	Meter pro Sekunde zum Quadrat
167	A/m	Amperes per meter
168	A/m^2	Ampere pro Quadratmeter
169	Am^2	Ampere-Quadratmeter
170	F	Farad
171	H	Henry
172	Ωm	Ohm-Meter
173	S	Siemens
174	S/m	Siemens pro Meter
175	T	Tesla
176	V/K	Volt pro Kelvin
177	V/m	Volt pro Meter
178	Wb	Weber
179	Cd	Candela
180	Cd/m^2	Candela pro Quadratmeter
181	K/h	Kelvin pro Stunde
182	K/min	Kelvin pro Minute
183	Js	Joule-Sekunden
256	min/K	Minutes per Kelvin
257	g/kg	Gramm per Kilogramm

4.3. Objects

4.3.1. General

Objects are consistently used in the DDC4000. This applies both for producing the firmware and for the plant structure and projecting.

The objects visible in the service interface are classified to aid the technician with a better clarification.

- **Software objects**
  Are functions that regulate the DDC Central Unit. These include for example the basic programs PID and heating and separate objects such as arithmetic.
  The basic programs were summarized by function. All software functions that are directly related to the GP PID are found under object number S238. This includes for example the cascade or Y limit. The parameters that are part of such functions are collected in folders and are therefore offered in the service level.
- **Hardware objects**
  are summarized functions that are used to control plant parts.
- **Basic objects**
  Basic objects are for example timer, marker, switches and the terminals of modules - the PINs.
- **system objects**
  These are functions that are processed in the central unit. In general they are not directly related to the plant. The system objects include for example setting the date and time or IP configuration.

Other objects exist within the object structure:

- **Attachment functions**
  (also called function objects). It is possible to attach functions to each parameter on the plant that change these parameters (e.g. scaling) or expand their function (e.g. source, BACnet object). Therefore the attachment functions are found below or on the parameters.
- **Sub-objects**
  These objects are used to more precisely describe an object. A key example a PIN. Each clamp in the plant is represented by a PIN. This PIN can be stipulated by a sub-object on an input or output, digital or analog.
  You also find sub-objects within the SBM51.

4.3.2. Software objects

4.3.2.1. What are software objects?

Software objects are summaries of control functions in a block with input and output values. The DDC4000 Central Units' software objects mainly match the menus of the DDC3000 system. The functions are summarized in unchangeable and tested blocks.

The basic programs were summarized by function. All software functions that are directly related to the GP PID are found under object number S238. This includes for example the cascade or Y limit. The parameters that are part of such functions are collected in folders and are therefore offered in the service level.

Parameters, names and classification

Parameters can be addressed in two different ways.
1. via the parameter number and 2. via the parameter name.
The parameter number is unique to only one object. Each object can have for example a parameter with the number 12 and the text "Rep". For this addressing is possible in sources and links both via language-unattached parameters and via parameter names. The use of texts instead of numbers is advantageous for planning plant assignments and when reading sources.

However for the software objects the numbering of the DDC3000 menu was used.

A customer-specific plain text can also be set for the relevant parameter.

4.3.2.2. All software objects

List of all software objects

SWO	belongs to
S066 limiting value	
S083 Arithmetic	
S116 Calendar	
S126 MMM storage	
S238 GP_PID	GP PID
S300 Optimization	Heating
S301 Y limitation	Heating and PID
S302 Y set	Heating and PID
S303 Cascade	PID
S304 Start-up switch [draft]	PID
S305 Optimize ventilation	PID
S306 FNK	PID
S307 stet_Frost	PID
S308 min_Roomtemp	PID
S309 Standstill	PID
S310 Energy selection	PID
S311 Sequence change	PID
S312 Limitation	Heating and PID
S313 Set point switching	Heating and PID
S314 Set point glide	PID
S315 Set point correction	Heating and PID
S316 Set point remote control	Heating and PID
S317 XP switching	Heating and PID
S318 Room correction	Heating
S321 Enthalpy	
S322 Sequence menu	Heating and PID
S323 Binary valuation	
S324 Scaling	

SWO	belongs to
S325 Min-Max-average MMM	
S326 Time gliding	
S327 Pulse counting	
S328 Operation hours	
S329 Heat volumeP	
S330 Heat volumeDT	
S333 Ring counter	
S334 Spreadsheet function	
S337 GP_Fixed value	GP Fixed value
S338 Gliding	
S342 Pulse output	
S343 E-Max	
S344 Degree daily figure	
S347 E-Max French	
S348 Adaptive heating curve	Heating
S901 Signal generator (for test purposes)	

object no.	name of object	release stage: 24.07.2006
S066	Boundry value	0.1.9
S083	Arithmetic	0.2.0
S116	Calendar	unreleased
S118	Scheduler	0.3.1
S126	Store MMM	0.4.0
S193	BP FBR01/02	unreleased
S194	BP FBR03	unreleased
S195	BP FBR04	unreleased
S238	GP PID	0.1.9
S239	BP heating	0.1.9
S309	Standstill	unreleased
S321	Enthalpy	0.3.1

object no.	name of object	release stage: 24.07.2006
S322	Sequence menu	0.1.39
S323	Binary value	0.3.1
S324	Scaling	unreleased
S325	Min/Max/Middle	0.1.47
S326	Time sliding	0.1.9
S327	Impulse count	0.4
S328	Operation hours	0.3
S329	Amt. heat calc	0.4
S330	Amt. heat DT	0.4
S333	Ring counter	0.4
S334	Table function	0.2.0
S335	Sensor switchover	0.1.47
S337	Fix value reg	0.1.9
S338	Sliding	unreleased
S342	Impuls Output	0.3
S343	E-Max	unreleased
S344	Nr. degree days	0.4
S347	E-Max france	unreleased
S901	Signal generator	unreleased

4.3.2.3. S066 limiting value

Activation

Sub-function of	all basic programs	99 times can be set
Can be switched on-off via	**5748 Q EA limiting value**	if not defined, ON

Function description

Analog values (measured or calculated values) can be monitored for going above or below limiting values with the DDC software object S066 limiting value. The value to be monitored is set in the **4839 Q limiting value** parameter. The stipulation of the min and max limiting value is made in the **8615 Selection (Min-Max-infringement)** parameter. If the value selected in the parameter **8610 limiting value** is reached an internal contact, parameter **2 g MENU OUTPUT limiting value** is set. The switch back takes place with a switch back difference in line with parameter **8612 Xsd**.

The limiting value can glide depending on any, analog command value, parameter **4832 Q COMMAND VALUE**. This guidance signal lifts or lowers the limiting value set. Any analog value in the DDC4000 system (e.g. outside temperature) can be selected as a guidance signal.

The command value only results in a change to the set point within a glide range. The glide range is stipulated by the parameters **8613 GLIDE START** and **8614 GLIDE END**.

The influence of the guidance signal on the limiting value change is determined with the parameter **8611 EF/GW**. If EF is negative this can force a reduction in the set point.

The current limiting value is indicated in the parameter **3 XS akt limiting value**. If no limiting value gliding is active (**COMMAND VALUE** invalid or **EF/GW** = 0), the **limiting value** and **XS akt limiting value** are identical. The function of the limiting value calculation can be switched ON (Status = 1) or OFF (Status = 0) using a binary source **5748 Q EA limiting value**. If no binary source is selected the function is switched ON.

Based on the start and end of glide-ing the following calculation arises for the set point gliding:

glide start < glide end		**glide end < glide start**	
Comvalue < glide start:	Delta_glide = 0	Comvalue < glide end	Delta_glide = EF * (glide start - glide end)
glide start < Comvalue < glide end	Delta_glide = EF * (Comvalue - glide start)	glide end < Comvalue < glide start	Delta_glide = EF * (glide start - Comvalue)
glide end < Comvalue	Delta_glide = EF * (glide end - glide start)	glide start < Comvalue	Delta_glide = 0

Set point = XS current (basic program) + Delta_glide

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
2	**g** Menu output limit	actual value boolean	--	--	0	--
3	**xsakt** Xs current Limit	actual value float	-infinity	+infinity	0	--
4832	**FG** Q GUIDE SIZE	actual value deletable float	-infinity	+infinity	deleted	--
4839	**Q G** SOURCE LIMIT	actual value deletable float	-infinity	+infinity	deleted	--
5748	**EA** Q EA Limiting value	actual value deletable boolean	--	--	deleted	--
8610	**Wert** Limit	set point float	-infinity	+infinity	95	--
8611	**EF/GW** EF/GW	set point float	-10	10	0	--
8612	**xsd** Xsd	set point float	0	999	1	--
8613	**Anf** Slide begin	set point float	-infinity	+infinity	22	--
8614	**End** Slide end	set point float	-infinity	+infinity	32	--
8615	Select	set point multistate	--	2	1	value,text 0,Minimum 1,Maximum

4.3.2.4. S083 Arithmetic

Activation

Sub-function of	basic heating program and PID	20 times can be set
Can be switched on-off via	**2153 Q EA Arithmetic**	If no binary source is set the calculation is constant.

Function summary

The DDC software object arithmetic carries out mathematic calculations.

Up to 4 analog values or also 4 digital values from the DDC4000 system and any constants can be integrated into the calculations.

The following can be used as mathematic operators:

Basic types of calculation with sample:

+	Addition	a+b
-	subtraction	a-b
*	multiplication	a*b
/	division	a/b
^	Power	a^b

mathematical functions:

sqrt	square root	sqrt(a)	
log	Logarithm on the basis of e (natural logarithm)	ln(a)	
log10	Logarithm on the basis of 10 (decimal logarithm)	log(a)	
exp	Exponent on the basis of e	exp(c)	
sin	sine	sin(3.141)	1)
asin	arc sine	asin(1)	2)
sinh	Hyberbolic sine	sinh(a)	
cos	Cosine	cos(3.141)	1)
acos	Arc cosine	acos(0)	2)
cosh	Hyberbolic cosine	cosh(b)	
tan	tangent	tan(3.141/2)	1)
atan	Arc tangent	atan(1)	2)

tanh	Hyberbolic tangent	tanh(c)	
abs	absolute number	abs(-3)	

1) Use with radian
2) Result in radian

Logical (Boolean) expressions:

=	same
!=	not equal
&	and
|	or
<	smaller
<=	smaller than or equal
>	greater
>=	greater than or equal

Exponentials of a figure (based on 10) are implemented with the aid of "**e**" or "**E**".
e.g.: (1E2) or (1e2) provides the value 100.

The expression "**exp**" is used to calculate the exponents based on e.

The calculation of bracketed expressions "(..)" is possible.

The following settings must be included:

- Formula up to 50 characters in length
- Operands a, b, c and d (only small letters)
- up to 8 different, numerical constants
- Constants in decimal depiction (decimal point, leading zero for figures under zero)
- up to 7 nested brackets (incl. invisible brackets for organizing the order of calculations)
- Spaces are possible (*a+b* or *a* + *b*)

Parameter **2152 result** depicts the result of the arithmetic calculation. This result can be set as the analog source for other arithmetic calculations or a true value 0 or 1 (floating value).

The result is invalid:
- if a source that is not available is set as an operand
- for division by zero
- if the calculation overruns
- if the formula is entered in another wrong way

Function description

In parameter **2146 ... 2149 Arithmetic sources** the maximum 4 analog sources are set. Up to 4 analog sources are set as operands a, b, c,and d in the mathematic formula.

Parameter **2151 Formula** sets the mathematic formula. The mathematical formula may be up to 50 characters long. It contains operands, operators, constants and brackets.
The following settings apply:
- Formula up to 50 characters in length
- Operands a, b, c and d (only small letters)
- up to 8 different, numerical constants
- Constants in decimal depiction (decimal point, leading zero for figures under zero)
- up to 7 nested brackets (incl. invisible brackets for organizing the order of calculations)
- Spaces are possible

Parameter **2152 result** depicts the result of the arithmetic calculation. This result can be set as the analog source for other arithmetic calculations or a true value 0 or 1.

The result is invalid:
- if a source that is not available is set as an operand
- for division by zero
- if the calculation overruns

With the parameter a binary source is used to switch the execution of the arithmetic calculation. If no binary source is set the calculation is constant. If this parameter is written with a valid zero the result is set to zero.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
2146	**Q_a** Arithmetic 1. Source	actual value deletable float	-infinity	+infinity	deleted	--
2147	**Q_b** Arithmetic 2. Source	actual value deletable float	-infinity	+infinity	deleted	--
2148	**Q_c** Arithmetic 3. Source	actual value deletable float	-infinity	+infinity	deleted	--
2149	**Q_d** Arithmetic 4. Source	actual value deletable float	-infinity	+infinity	deleted	--
2151	**Formel** Formula	set point deletable text	--	--		--
2152	**erg** RESULT	actual value float	-infinity	+infinity	0	--
2153	**Q_EA** Q EA Arithmatic	actual value deletable boolean	--	--	deleted	--

4.3.2.5. S126 MMM storage

Activation

Sub-function of	-	20 times can be set

Function summary

The DDC software object S126 MMM storage supplies the maximum value, minimum value and average of an analogue source. In addition the values determined by the analogue source can be saved for a particular point of time.

2165 source MMM
plannable source on any analogue value of the DDC4000 system.

If the source is invalid or deleted the current min, max and average values are frozen. When the source is valid again the current min, max and average values are reset to the current source value. The saved values are not affected by this.

2166 Max act.
Maximum value determined since the time of the last reset.

2167 Min act.
Minimum value determined since the time of the last reset.

2168 Average act.
Average value calculated since the time of the last reset.

2195 Q storage
plannable source on any binary value of the DDC4000 system. With the change from "0" to "1" the min, max and average values are reset and saved.
For example the values can be saved for a defined period of time through the use of a time program output. Through the use of a timer the saving can be released at regular intervals.

2196 Max stor.
Maximum value at the reset time.

2197 Min stor.
Minimum value at the reset time.

2198 Average stor.
Average value at the reset time.

2199 Input stor.
Current value of the **2165 source MMM** at the reset time.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
2165	**Q_Input** Store Source MMM	actual value deletable float	-infinity	+infinity	deleted	--
2166	**Max** Max Value / t	actual value float	-infinity	+infinity	0	--
2167	**Min** Min Value / t	actual value float	-infinity	+infinity	0	--
2168	**Mittel** Average Value / t	actual value float	-infinity	+infinity	0	--
2169	DATE	actual value integer	0	0	0	--
2195	**Q_Sp** Store Q	actual value deletable boolean	--	--	deleted	--
2196	**Max_s** Stored Max Value	actual value float	-infinity	+infinity	0	--
2197	**Min_s** Stored Min Value	actual value float	-infinity	+infinity	0	--
2198	**Mittel_s** Stored Average Value	actual value float	-infinity	+infinity	0	--
2199	**Input_s** Stored Input	actual value float	-infinity	+infinity	0	--
2200	TIME	actual value integer	0	24	0	h

4.3.2.9. S238 Basic program PID (ventilation)

Activation

Basic program	PID (ventilation)	can be set 12 x

Function summary

This basic program is a PID control with 4 sequences. Using binary source parameters integration into the ventilation controls and regulations is possible without any problems.
Function extensions are made via DDC soft- and hardware objects.

Function description

The control variable sensor must be defined in parameter **5102 source control variable**. Any DDC4000 system analog value can be set.

As an outside sensor, any analog value in the DDC system can also be set in parameter **5103 source TO**. This parameter is used in combination with other DDC sub-software objects , e.g.**S307 constant frost protection**. If not required, no setting is required.

In parameter **5100 XS** the desired set point for the fixed value regulation is set. On the basis of this set point and the function of other DDC sub-software objects (e.g. **S314 set point gliding**, **S313 set point switching**) a new set point is calculated that is depicted as the current value on parameter **5101 XS current**.

In the basic PID program up to 4 constant Y outputs are available. The calculation of the Y outputs is made if the control circuit is in "Control ON" operation mode. Otherwise the Y outputs are in the status assigned to them for the uncontrolled status by parameter **5127 uncontrolled condition**. (0 = 0 %, 1 = 100 %)

The values of the Y outputs calculated by the basic program can be overwritten by manual intervention (**7801 manual intervention .. 7804 manual intervention Y04**), BMS intervention (**h01 .. h04**) or by DDC sub-software objects (e.g. **S302 Y set**).

The current values of the Y outputs are displayed in the parameters **5110 YL1... 5113 YL4**.

For each Y output a max and min limit parameter **5141 .. 5148** can be set (e. g. for stipulating a minimum outside air rate MAR).

In parameter **5126 Sequence** various sequences can be set for the individual Y outputs.

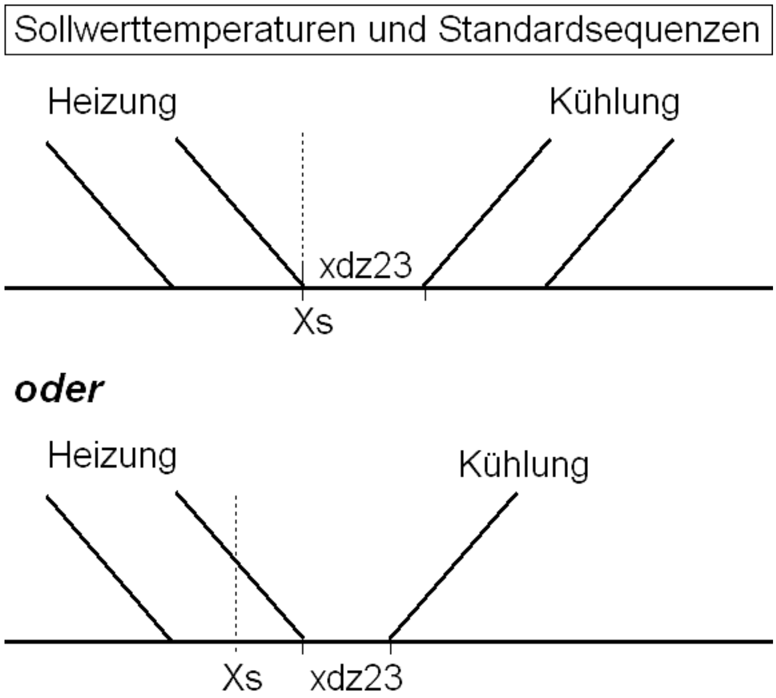
The output of the Y output values occurs via source parameterizing in the basic programs of the DDC Central Units (DDC4000) and the DDC modules (DDC bus module BMA, field bus module FBM, control cabinet bus module SBM).

The parameters **5130 .. 5132 Xdz..** can stipulate idle zones between the individual Y output sequences. The situation of the relevant set point can be seen from the figure.

These idle zones also work when the control circuit has an integral share, parameter **5106 tN**, i. e. the I-share is switched off on the edge of XpY. If the actual value in the Xp range of the next sequence occurs the I-share is stocked up again. This results in the idle zone range not being run through as a result of the effect of the I-share and a real energy saving effect is achieved.

In parameter **5128 xwh** an insensitivity zone is set, i. e. within xw +/- xwh the Y outputs are not changed. If xw exceeds this range the control is normal.

Example:
Set point point for 4 or 3 sequences



Using the central influence, remote control and usage time program the internal contact **I011 plant on** is controlled in the basic ventilation program. If the fan is to be started as a result of the conditions stated above first the internal contact **I011 plant on** is switched to "1".

When the subsequent control is started and there is a return message via **5140 Q Release control** the control is quitted with the internal contact **I012 control on** set to "1".

These and other internal contacts switch as per the status of the control circuit and can be used for other PLC links.

Priorities
Switch basic ventilation program to normal operation

1. Highest priority:
   For releasing the control a binary source is entered in parameter **5140 Q Release control** e. g. the return message from the ventilation protection. If parameter **5140 Q release control** is not set the basic program is constantly in normal operation (**I012 Control ON** = 1).
2. The multistate input **5138 Source remote ON** with its potential modes**Automatic / source remote on / source remote off** is used to switch the plant on and off. This means remote control and / or operating the plant independently on the usage time program set is possible.
   If the **source remote ON** is not set or set to automatic mode, the PID basic program depends on any remote control by a BMS or the assigned usage time program.

3. A Z contact in the PID basic program enables the central building control plant to influence the status of ventilation control. The multistate parameter **Z Z contacts** can take on the **Automatic / Z1-day / Z4-off** modes.
   If the Z contact is not influenced or the **Automatic** state set the PID basic program depends on the assigned usage time program.
4. Lowest priority:
   Parameter **Q_N** assigns the weekly usage time and/or special holiday, bank holiday or special usage times to a schedule object S118. If no time program is assigned to the PID basic program the plant is always ON (**I011 plant ON** = 1).

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5100	**XS** XS	set point float	-9999,9	9999,9	20	C
5101	**Xs akt** XS current	actual value float	-9999,9	9999,9	0	C
5102	**Qreg** Source controlled variable	actual value deletable float	-infinity	+infinity	deleted	C
5103	**TA** Source TA	actual value deletable float	-999	999	deleted	C
5105	**xw** XW	actual value float	-9999,9	9999,9	0	K
5106	**tN** tN	set point deletable integer	1	99	3	min
5110	**Y1** YL1	actual value float	0	100	0	%
5111	**Y2** YL2	actual value float	0	100	0	%
5112	**Y3** YL3	actual value float	0	100	0	%
5113	**Y4** YL4	actual value float	0	100	0	%
5115	**Q_N** State N	actual value deletable text	--	--	deleted	--
5120	**XPY1** XPY1	set point float	0,5	9999,9	10	K
5121	**XPY2** XPY2	set point float	0,5	9999,9	10	K
5122	**XPY3** XPY3	set point float	0,5	9999,9	10	K

No.	name of parameter	parameter typ	min	max	init	unit
5123	**XPY4** XPY4	set point float	0,5	9999,9	10	K
5125	**D** Vorhalt	set point deletable integer	1	299	deleted	s
5126	\V/ Sequence	set point integer	0	255	48	--
5127	**NRegZust** Not controlled condition	set point selection list	--	--	0	selection list No.,text 0,for Y1 1,for Y2 2,for Y3 3,for Y4
5128	**xwh** xwh	set point float	0	9999,9	0	K
5130	**xdz12** Xdz 12	set point float	-9999,9	9999,9	0	K
5131	**xdz23** Xdz 23	set point float	-9999,9	9999,9	0	K
5132	**xdz34** Xdz 34	set point float	-9999,9	9999	0	K
5138	**QFern** Q Remote control	actual value multistate	--	3	2	value,text 1,Source remote ON 0,Source remote OFF 9,Automatic
5140	Q RELEASE Regelung	actual value deletable boolean	--	--	deleted	--
5141	**Y1min** Y1 min	set point float	0	100	0	%
5142	**Y2min** Y2 min	set point float	0	100	0	%
5143	**Y3min** Y3 min	set point float	0	100	0	%
5144	**Y4min** Y4 min	set point float	0	100	0	%
5145	**Y1max** Y1 max	set point float	0	100	100	%
5146	**Y2max** Y2 max	set point float	0	100	100	%

No.	name of parameter	parameter typ	min	max	init	unit
5147	**Y3max** Y3 max	set point float	0	100	100	%
5148	**Y4max** Y4 max	set point float	0	100	100	%
5169	**TAm** TA middle	actual value float	-50	150	0	C
7801	**hY1** Manual influence Y1	set point deletable float	0	100	deleted	%
7802	**hY2** Manual influence Y2	set point deletable float	0	100	deleted	%
7803	**hY3** Manual influence Y3	set point deletable float	0	100	deleted	%
7804	**hY4** Manual influence Y4	set point deletable float	0	100	deleted	%
h01	Analoge GLT influence 1	actual value deletable float	0	100	deleted	%
h02	Analoge GLT influence 2	actual value deletable float	0	100	deleted	%
h03	Analoge GLT influence 3	actual value deletable float	0	100	deleted	%
h04	Analoge GLT influence 4	actual value deletable float	0	100	deleted	%
i011	System ON	actual value boolean	--	--	0	--
i012	Control ON	actual value boolean	--	--	0	--
Z	**Z** Z-contacts	set point multistate	--	3	2	value,text 1,Z1 Day 0,Z4 Off 9,Automatic

*	Nr.	Beschreibung
1)	5115	Hier wird die Zuweisung zum Scheduler (Wochenprogramm) durchgeführt. Dieser Parameter beschreibt den Zustand des Zeitprogramms für die Regler im folgenden Format: aktuellerModus, nächsterModus, Zeit bis Modus Wechsel in Minuten. Ungültige Werte ergeben sich durch weglassen. Folgende Zustandswerte für den Modus werden unterstützt: 1=Tag, 2=Nacht, 4=Aus (Aus wird demnächst auf 0 geändert)

DDC sub-software objects

4.3.2.9.1. S301 Y limitation

Activation

Sub-function of	each heating and ventilation basic program	0 ... can be set 4 x
Can be switched on-off via	5319 Q EA Y limitation	if not linked, ON

Function summary

The DDC software object S301 Y limitation influences the min or max limits of the Y outputs for the DDC control circuits (basic program).
A difference is to be made between two influence options that can jointly affect the basic function of the DDC control circuits:

1. Depending on a limitation factor the Y outputs Y-min or Y-max set in the basic program for the DDC control circuits are altered. The influence on the Y-min or Y-max occurs after the limitation factor reaches a particular limiting value.
   - For the MAX limit the limiting value must have exceeded the limiting value.
   - for the MIN limit the limitation factor must be below the limiting value so as to influence the setting range of the Y-outputs.
   - By inverting the Y-limit YES / NO the direction of influencing the Y-setting range is stipulated.
2. In addition to the functions stated in 1 the limiting value of the limitation factor can itself glide in a particular range. I.e. depending on the outside temperature (basic program) the limiting value of the limitation factor is also changed.

Function description

Re 1:

The limitation factor is set in parameter **5311 source Y-limitation**. Any DDC4000 system analog value can be set.

The Y-limitation influences the Y-output parameterized on parameter **5310 Y-limit. on**.

The DDC sub.menu **Y-limit** can be installed and set repeatedly for a DDC control circuit. If several **Y-limitation** DDC sub-menus work on the same Y output, the min and max limits calculated for each DDC software object are added.

For the basic PID program you have to choose between the 4 potential Y outputs.
For the basic heating program the Y limit always works on the heating control for a Y output.

Parameter **5312 YB-limiting value** sets the value from which the Y limit should act on the Y output setting range.

Parameter **5313 YB limitation** stipulates
whether a MAX limitation, i.e. exceeding the limiting value (image 3, image 4)
o r
a MIN limitation, i.e. going below the limiting value (image 1, image 2)
should affect the setting range of the Y output.

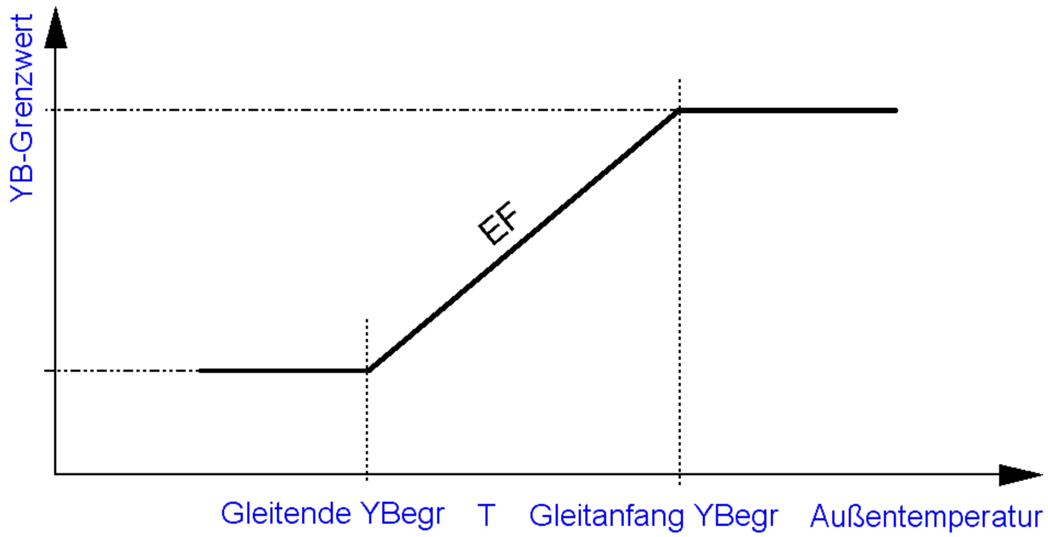
Parameter **5314 YB Inverting** stipulates the direction of the influence. (direction of curve)
5314 YB Inverting = NO -> (image 1, image 3),
5314 YB Inverting = YES -> (image 2, image 4),

Parameter **5315 XP Y-limitation** is the proportional range within which the Y-min or Y-max for the Y-outputs can be moved depending on the limitation factor.
5315 XP Y-limitation = 10 means: for 10 units change in the limitation factor Y-min or Y-max on the Y-output is moved by 100%.
5315 XP Y-limitation = 100 means: only for 100 units change in the limitation factor is Y-min or Y-max on the Y-output moved by 100%.

Re 2:

Depending on a command value (outside temperature, source parameter **5103 source TO** in the basic program of the DDC control circuit) the limitation value stipulated in parameter **5312 YB-limitation value** can glide.
The glide range is set in parameters **5317 glide start YLim** and **5318 glide end YLim**.

The influence of limiting value glide is set in parameter **5316 EF Ylimitation**.
5316 EF Ylimitation = 1 means: When changing the command value (outside temperature) by 1 K the limiting value stipulated in the **5312 YB-limiting value** parameter is moved by 1 unit.
5316 EF Ylimitation = 10 means: When changing the command value (outside temperature) by 1 K the limiting value stipulated in the **5312 YB-limiting value** parameter is moved by 10 units.



Priorities

The y-limitations 1-4 also work on the basic program's Ymin/Ymax.

Priority	Function
Highest	Y limitations of the basic program
	5141 Y1min, 5145 Y1max

Priority	Function
	...
	5144 Y4min, 5148 Y4max
lowest	DDC software sub-objects Y-limitation

Figure 1
Y limitation as
5313 YB-limitation = MIN
5314 YB Inverting = NO

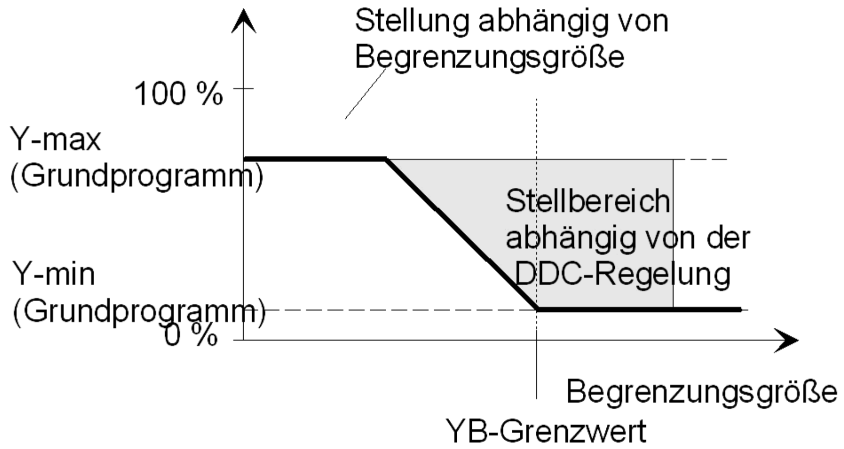


Figure 2
Y limitation as
5313 YB-limitation = MIN
5314 YB Inverting = YES

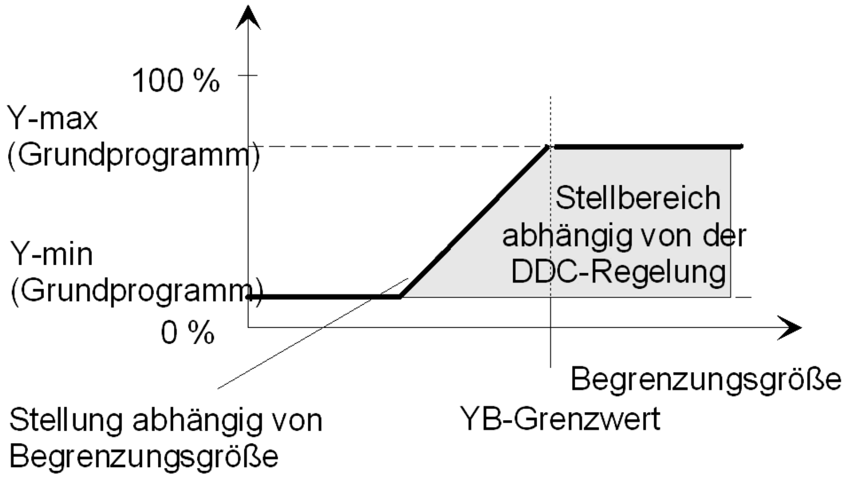


Figure 3
Y limitation as
5313 YB-limitation = MAX
5314 YB Inverting = NO

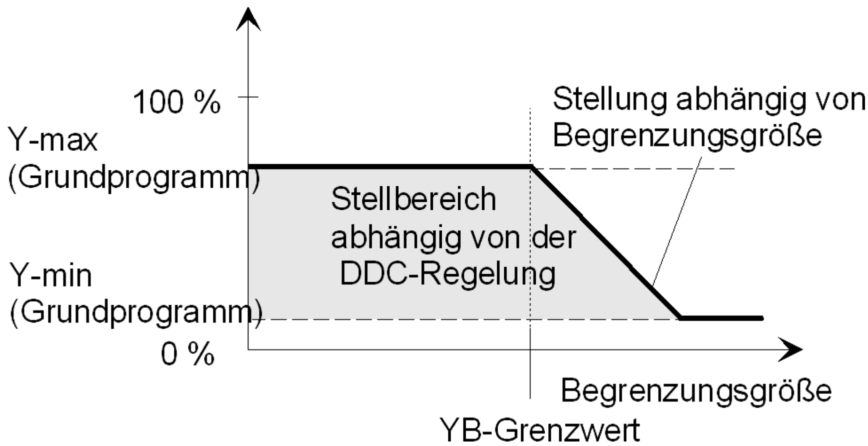
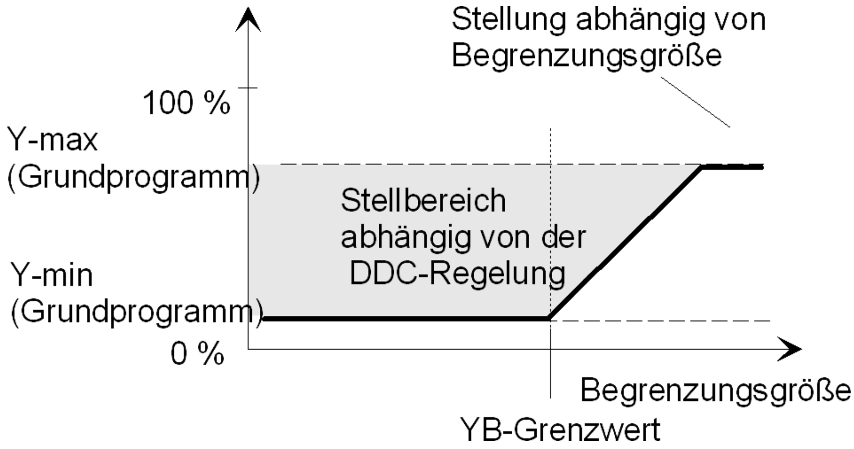


Figure 4
Y limitation as
5313 YB-limitation = MAX
5314 YB Inverting = YES



Parameters

Parameter 5313 Min/Max selection : "yes" = "1" means Max

No.	name of parameter	parameter typ	min	max	init	unit
5310.1	Y limit. affects	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5311.1	**Q1** Source Y-limitation	actual value deletable float	-infinity	+infinity	deleted	--
5312.1	**G1** YB-Limiting value	set point float	-infinity	+infinity	150	--
5312.2	**G2** YB-Limiting value	set point float	-infinity	+infinity	150	--
5313.1	**MMBegr1** YB-limitation	set point boolean	--	--	1	--
5314.1	**Inv1** YB Inversion	set point boolean	--	--	0	--
5315.1	**XP1** XP Y limitation	set point float	1	200	10	--
5316.1	**EF1** EF Y limitation	set point float	0	10	0	--
5317.1	**Anf1** Slide begin YBegr	set point float	-infinity	+infinity	22	C
5318.1	**End1** Slide end Y limit	set point float	-infinity	+infinity	32	C

No.	name of parameter	parameter typ	min	max	init	unit
5319.1	**EA1** Q EA Y-limitation	actual value deletable boolean	--	--	deleted	--
5320.1	**YBegr** Y-Limiting 1 active	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5310.2	Y limit. affects	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5311.2	**Q2** Source Y-limitation	actual value deletable float	-infinity	+infinity	deleted	--
5312.2	**G2** YB-Limiting value	set point float	-infinity	+infinity	150	--
5313.2	**MMBegr2** YB-limitation	set point boolean	--	--	1	--
5314.2	**Inv2** YB Inversion	set point boolean	--	--	0	--
5315.2	**XP2** XP Y limitation	set point float	1	200	10	--
5316.2	**EF2** EF Y limitation	set point float	0	10	0	--
5317.2	**Anf2** Slide begin YBegr	set point float	-infinity	+infinity	22	C
5318.2	**End2** Slide end Y limit	set point float	-infinity	+infinity	32	C
5319.2	**EA2** Q EA Y-limitation	actual value deletable boolean	--	--	deleted	--
5320.2	**YBegr** Y-Limiting 2 active	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5310.3	Y limit. affects	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4

No.	name of parameter	parameter typ	min	max	init	unit
5311.3	**Q3** Source Y-limitation	actual value deletable float	-infinity	+infinity	deleted	--
5312.3	**G3** YB-Limiting value	set point float	-infinity	+infinity	150	--
5313.3	**MMBegr3** YB-limitation	set point boolean	--	--	1	--
5314.3	**Inv3** YB Inversion	set point boolean	--	--	0	--
5315.3	**XP3** XP Y limitation	set point float	1	200	10	--
5316.3	**EF3** EF Y limitation	set point float	0	10	0	--
5317.3	**Anf3** Slide begin YBegr	set point float	-infinity	+infinity	22	C
5318.3	**End3** Slide end Y limit	set point float	-infinity	+infinity	32	C
5319.3	**EA3** Q EA Y-limitation	actual value deletable boolean	--	--	deleted	--
5320.3	**YBegr** Y-Limiting 3 active	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5310.4	Y limit. affects	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5311.4	**Q4** Source Y-limitation	actual value deletable float	-infinity	+infinity	deleted	--
5312.4	**G4** YB-Limiting value	set point float	-infinity	+infinity	150	--
5313.4	**MMBegr4** YB-limitation	set point boolean	--	--	1	--
5314.4	**Inv4** YB Inversion	set point boolean	--	--	0	--
5315.4	**XP4** XP Y limitation	set point float	1	200	10	--
5316.4	**EF4** EF Y limitation	set point float	0	10	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5317.4	**Anf4** Slide begin YBegr	set point float	-infinity	+infinity	22	C
5318.4	**End4** Slide end Y limit	set point float	-infinity	+infinity	32	C
5319.4	**EA4** Q EA Y-limitation	actual value deletable boolean	--	--	deleted	--
5320.4	**YBegr** Y-Limiting 4 active	actual value boolean	--	--	0	--

4.3.2.9.2. S302 Y set

Activation

Sub-function of	basic heating and ventilation program	0 ... can be set 4 x
Can be switched on-off via	5327 Q Y-SET	if not defined, ON

Function summary

With the Y-set DDC submenu the Y outputs of the DDC control circuits are stipulated by binary signals on certain (parameterizable) Y-values. If the binary signal = 1 the stipulated Y value works on the Y output.

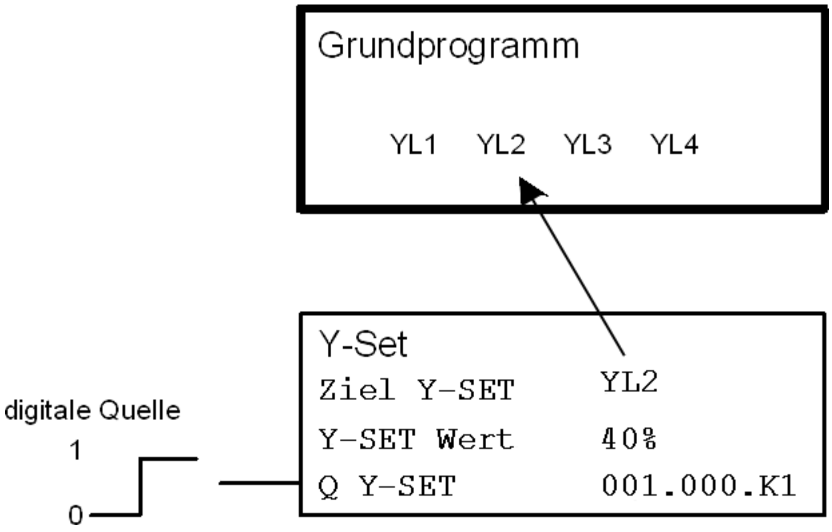
Function description

The Y-set DDC software object can be installed and set up to four times for one DDC control circuit. For this Y-set can work repeatedly on the same Y-output.

The address of the binary source is entered in parameter **5327 Q Y-SET**. If the binary source ="1", the analog value set in parameter **5326 Y-SET value** (0 ..100 %) is transferred to the Y-output. Parameter **5325 destination Y-SET** sets the Y output that is to be influenced.
For the basic PID program you have to choose between the 4 potential Y outputs. For the basic heating program the Y-set always works on the heating control for a Y output.

Priorities

Priority	Function
Highest	Manual intervention
	Central influence
	Y set (Index 01)
	Y set (Index 04)
	Limitation functions
lowest	Basic program control function



Parameters

Parameter 5325.x only applies if used in the GP PID!

No.	name of parameter	parameter typ	min	max	init	unit
5325.1	**Ziel1** Destination Y set	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5326.1	**Wert1** Y set value	set point float	0	100	0	%
5327.1	**Q1** Q Y fix	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5325.2	**Ziel2** Destination Y set	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5326.2	**Wert2** Y set value	set point float	0	100	0	%
5327.2	**Q2** Q Y fix	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5325.3	**Ziel3** Destination Y set	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5326.3	**Wert3** Y set value	set point float	0	100	0	%
5327.3	**Q3** Q Y fix	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5325.4	**Ziel4** Destination Y set	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5326.4	**Wert4** Y set value	set point float	0	100	0	%
5327.4	**Q4** Q Y fix	actual value deletable boolean	--	--	deleted	--

4.3.2.9.3. S303 Cascade

Activation

Sub-function of	Basic PID program	can be set 1 x
Can be switched on-off via	**5210 Source EA cascade**	if not defined, ON

When switching between ON/OFF and OFF/ON a gliding transfer takes place in the control unit!

Function description

In the DDC sub-menu S303 Cascade the exhaust air temperature sensor is set in parameter **5200 Cascade sensor**. The supply air temperature is in parameter **5102 Source control variable** from the PID basic program.

Example:
Main control variable: exhaust air in DDC cascade sub-menu
Auxiliary control variable: supply air in the basic program

If the exhaust air temperature (main control variable) varies from the current set point **5101 XSactual** the supply air temperature (auxiliary control variable) is raised or lowered. The supply air set point **5205 XS supply air Casc.** counteracts the offset in the room and ensures fast, stable control.

The exhaust air control circuit works in the normal setting with a P control behavior. The influence of the offset room/exhaust air on the supply air change is set with parameter **5201 ER** (Xs supply air = XS current + ER * xw room/exhaust air). If the room or exhaust air temperature works as a PI control function on the supply air control circuit the reset time for the exhaust air control circuit is entered in parameter **5202 tN cascade**.

Depending on the setting in **5202 tN cascade** the following control behaviour can be set:
P/P- , PI/PI- , P/PI- , PI/P behavior

For the supply air temperature it is possible to set both a minimum and a maximum limit (parameter **5203 supply air min limit, 5204 supply air max limit.**)

If the supply air temperature is lower than **5203 supply air min limit** or exceeds **5204 supply air max limit**, the internal output **I021 Limit cascade** is set to "1". If a valid value is entered in parameter **5273 XP limit** for all basic program XPYs are switched to XP Limit cascade and the I20 (XP switching) is also activated.

If the max. limiting value is below the min limiting value the max. limiting value is invalid.

Parameter **5208 Maxdiff** sets a limit for the temperature difference between the supply air temperature and room temperature. The precondition for limiting the temperature difference is placing the control variable sensor in the room. This limit function prevents temperature layers in high, cold rooms or halls. For an unlimited increase in temperature difference between supply air and room the cooler, heavier air in the lower part of the room would act as an air cushion that is not penetrated by the warmer, lighter supply air from the ceiling.

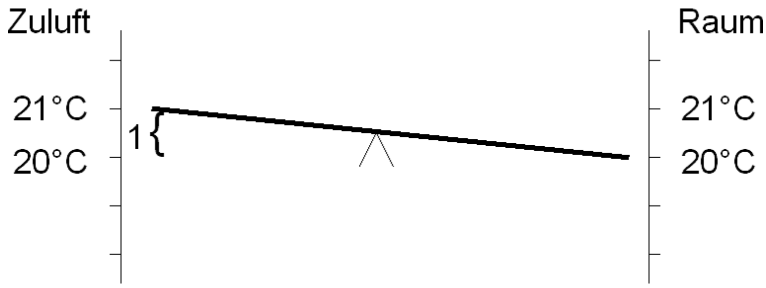
Parameter **5208 Maxdiff** can also be set to negative. In this case the supply air on **5208 Maxdiff** is

forcibly changed to less than the room temperature. This control behavior is for example necessary for operating theatres which require a cooler supply air cone above the operating table.
Maxdiff therefore influences the cascade's supply air max limit: There is a Min selection between **supply air max limit** and room temperature + **Maxdiff**)

Parameter **5209 Diff supply air Room** presets a difference between the supply air set point and room set point.
The maximum limit for the supply air has priority over the limitation of the temperature difference between supply air and room.

Internal loads and constant heat requests would create a permanent difference to the room set point. This constant difference would require cooler or warmer supply air to remain constant. To prevent this a difference value between the supply air temperature and room temperature can be set.

Example:
If parameter **5209 Diff.supply air** is e.g. 1K, the rocker is moved by 1 K, i.e. if xw=0 the supply air is 1 Kelvin higher than the room temperature. (constant heat feed)



The difference **5209 Diff.supply air** can be set both positive and negative.

The function of the DDC sub-menu can be switched ON or OFF with a binary source.
(5210 Source EA Cascade)
If no binary source is set, the function is switched to ON.
When switching between ON/OFF and OFF/ON a gliding transfer takes place in the control unit!

Priorities

If the DDC sub-software object set point glide is installed and activated for the PID basic program a set point gliding also results in glide-ing the XS current in the PID basic program (room set point) as well as to glide-ing the supply air-Min limitation if "Yes" is set in parameter **5207 gliding cascade**.
The maximum limit for the supply air has priority over the limitation of the temperature difference between supply air and room.

Example:
The function of the cascade control can be compared with a rocker. The room or exhaust air temperature works on the right level of the rocker. The left lever raises or lowers the supply air.
The length of the supply air lever can be compared with the influence exhaust air IR setting: At IR = 3 the supply air lever would be 3 times longer as the exhaust air lever, at IR= 5, it would be 5 times as long.
The functions are clarified via the following images. The room/exhaust air temperatures affects the supply air movement with a P control behavior: (tN Cascade = -- min).

Settings:
Set point XS = 20 °C, (basic program)
Influence exhaust air IR = 3,

Figure 1
Current exhaust air value agrees with set point XS = 20°C. In this case supply air is also 20°C.

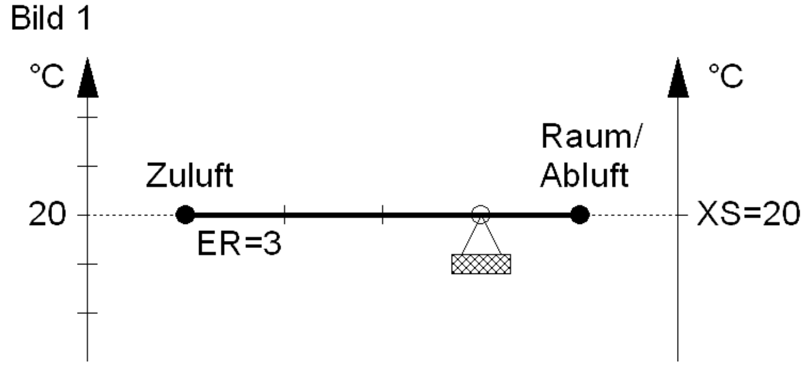


Figure 2
Current exhaust air value increases to 21°C, control difference = 1K. Without min limit the supply air is reduced to 17°C. supply air movement = (offset.) 1K * (ER) 3 = 3K

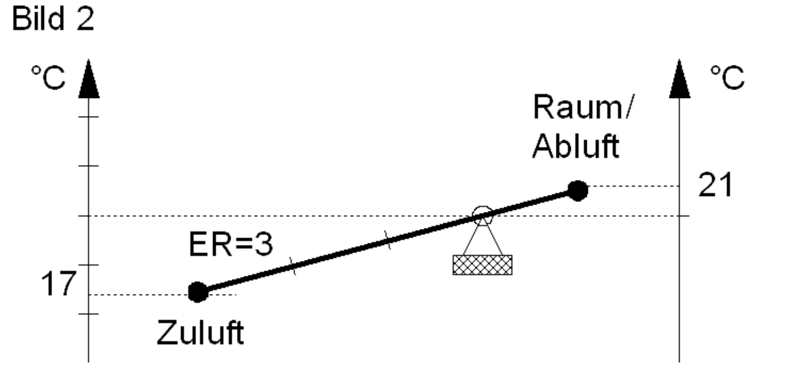


Figure 3
Setting: suppairminlimit: 18°C, supply air may not be below 18° C.

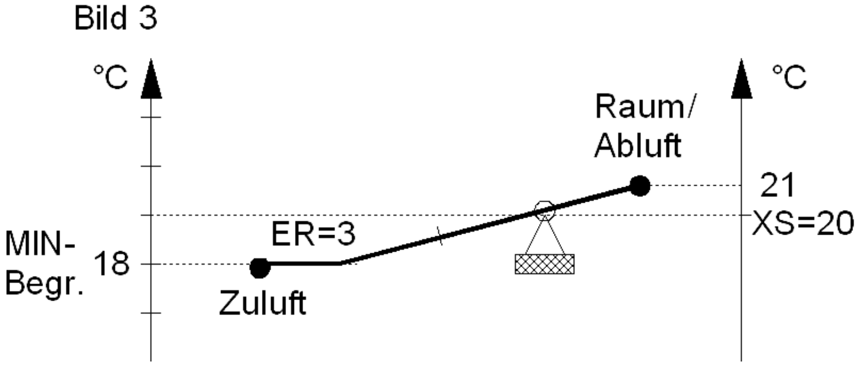


Figure 4
Current exhaust air value falls to 18°C, control difference = 2K. Without max limit the supply air is raised to 26°C.
supply air movement = (offset.) 2K * (ER) 3 = 6K

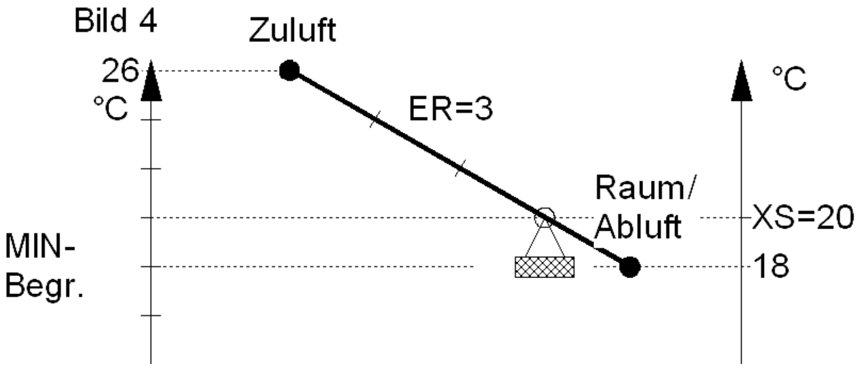


Figure 5
Setting: suppairmaxlimit: 25°C, supply air may not exceed 25°C.

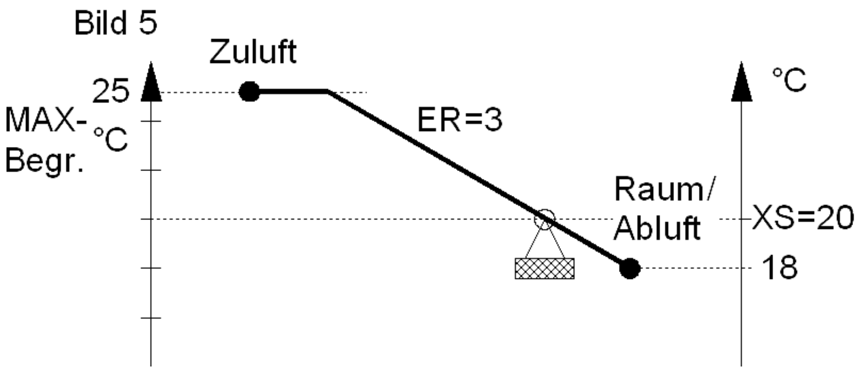
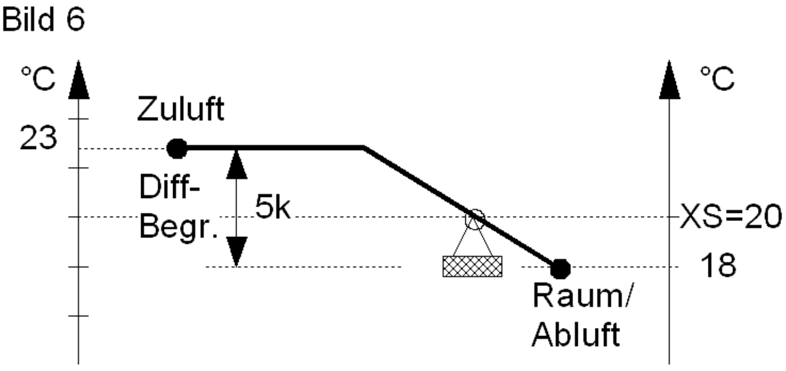


Figure 6
Setting: Diff limit between room and supply air to 5.0K:
Maxdiff: 5.0K, temperature difference between room and supply air may not be larger than 5.0K.



Priorities

Priority	Function
Highest	Limit 1 **S312.1**
	Cascade (only PID) **S303**
	Limit 2**S312.1**
	XP conversion **S317**
lowest	Structure delay start-up **S304**

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5200	**b** cascade probe	actual value deletable float	-infinity	+infinity	deleted	--
5201	**ER** ER	set point float	0,1	50	3	--
5202	**tN** tN cascade	set point deletable integer	0	99	deleted	min
5203	supply air min limit.	set point float	-9999	9999	18	--

No.	name of parameter	parameter typ	min	max	init	unit
5204	supply air max limit.	set point float	-9999	9999	65	--
5205	**XS Zul** XS feed cascade	actual value float	-9999,9	9999,9	0	--
5206	**XP Beg** XP Lim.Casc	set point deletable float	0,5	999	deleted	--
5207	Slide Casc	set point boolean	--	--	0	--
5208	Max diff	set point deletable integer	-9999	9999	deleted	--
5209	Diff. supply air room	set point float	-9999,9	9999,9	0	--
5210	**EA** Source EA cascade	actual value deletable boolean	--	--	deleted	--
5211	**xw** Xw cascade	actual value float	-9999,9	9999,9	0	--
i021	**begr** Limitation cascade	actual value boolean	--	--	0	--

4.3.2.9.4. S304 start up switching

Activation

Sub-function of	basic ventilation program	0 ... can be set once
Can be switched on-off via	5438 Q EA start-up	if not defined, ON

Function summary

The movement switch only switches the ventilation plant on when the heating register is heated.

Function description

The movement switch is released (**I022 Movement** = 1) when the external temperature falls below the value parameterized in **5332 TOgrenz AF** and the control = NIGHT is in automatic operation via a timing program or the control = OFF due to forced control (Remote OFF or Z-contact OFF).
(The lower external temperature is just one criterion for movement switching! If the external temperature goes up during an active movement phase this does not abort!)
If the ventilation plant is operational, e.g. as a result of usage times or remote switching the selected heating valve opens first **5331 Target movement Y.** After the entered opening time **5335 Opening time** has ended the heating valve is 100% open. The length of the total cleaning time depends on whether a return temperature sensor was connected.

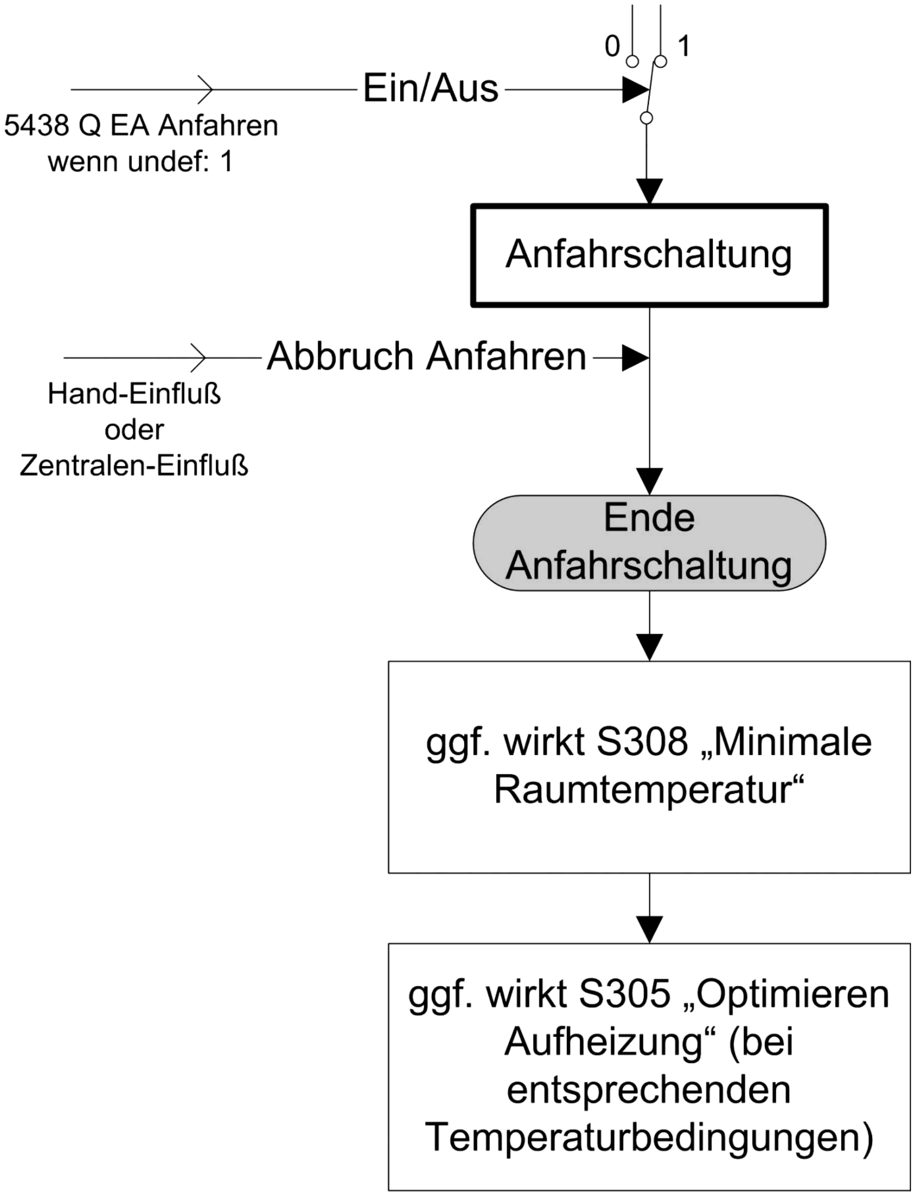
a) There is **no** return temperature sensor available:
At the same time as the opening the release delay is also active **5336 Release delay.** After it ends the internal contact **I011 Plant ON** = 1 is switched on.

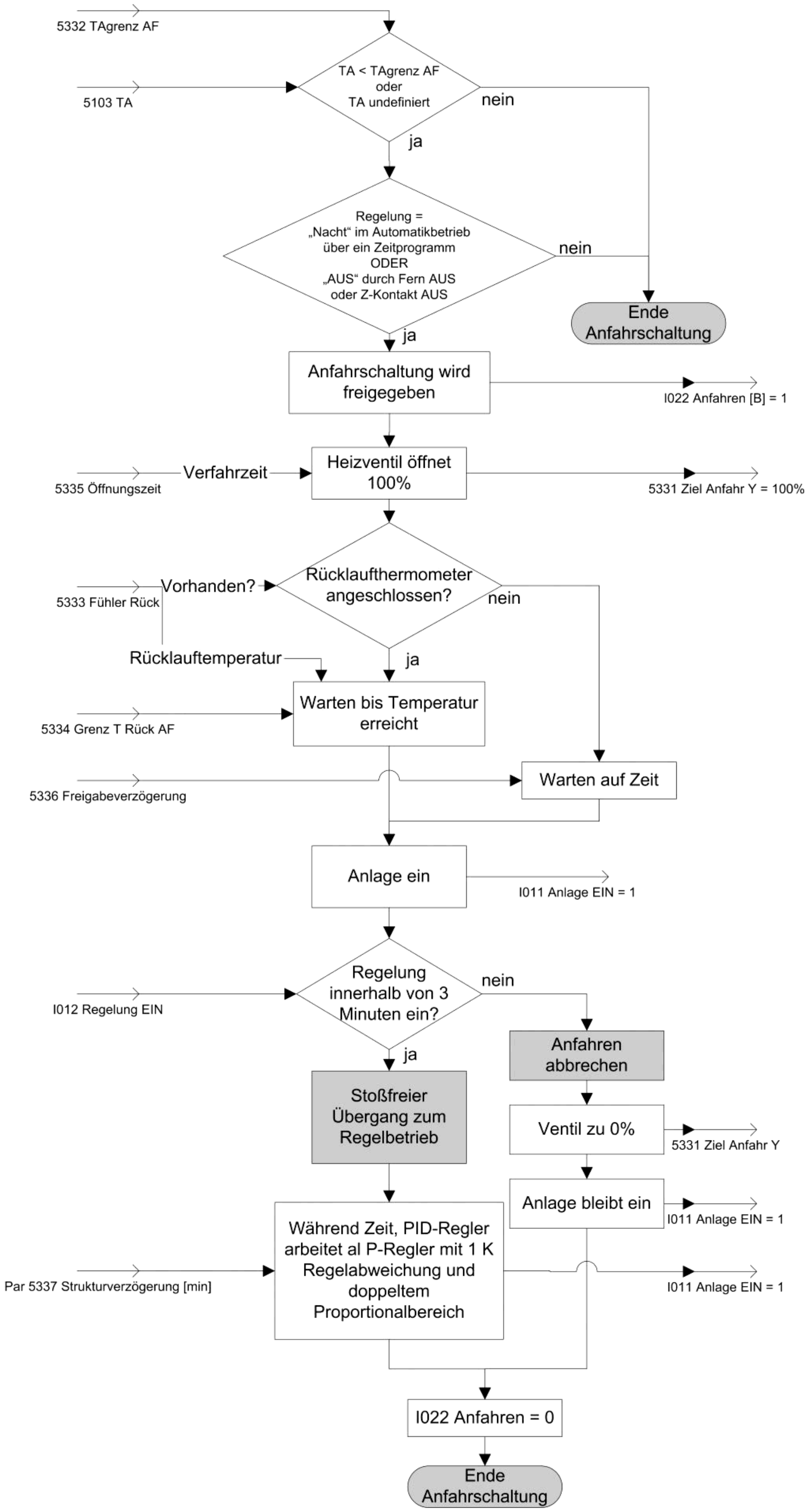
b) There is **a** return temperature sensor **5333 Return sensor** available:
The heating valve is opened until the return temperature sensor the limiting value **5334 Limit T Return AF** is exceeded. Then the internal contact
I011 Plant ON =1 is switched on.

The heating valve remains in the last position until the internal contact **I012 Control ON** switches on the PID control.
If the control is not switched on via **I012 Control ON** the movement process is aborted. The heating valve closes again. However the movement switch remains active (**I022 Movement** = 1).

After the internal contact **I012 control ON** = 1 has been switched on the transfer from advance opening of the heating valve /reaching the return temperature to regular operation occurs without impacts. The impact-free switching occurs with the aid of a period stated in **5337 Structure delay**. In this period the PID controller is operated as the P-controller with a normal variance limited to maximum 1 K and double proportional range.
[XWStructure delay = MAX(XWGP, 1 K), XPStructure delay all Y = 2 * XPGP Movement Y]

The "movement" status, i.e. the ventilation plant should become operational and the movement switching works, is indicated throughout the whole time by internal contact **I022 Movement** = 1.


0
1
Ein/Aus
5438 Q EA Anfahren
wenn undef: 1
Anfahrschaltung
Abbruch Anfahren
Hand-Einfluß
oder
Zentralen-Einfluß
Ende
Anfahrschaltung
ggf. wirkt S308 „Minimale Raumtemperatur“
ggf. wirkt S305 „Optimieren Aufheizung“ (bei entsprechenden Temperaturbedingungen)



kieback&peter

Special Functions

If during the movement process the manual influence or central influence is exercised, the movement process is aborted and the desired control status is started.
The external sensor used is the PID control set in the parameter in the basic program **5103 TO**. If no external sensor is set in the basic program the movement switch always works.
The function as to whether the DCC submenu start up works in the conditions stated above can be switched on (Status = 1) or off (Status = 0) via a binary source (**5438 Q EA Movement**). If no binary source is set the function can always operate.
If additionally DDC sub-menu **15308 Minimum room temperature** is set the movement switching can also be switched via the **minimum room temperature** to OFF in the control status, i.e. if the **minimum room temperature** becomes active the movement switching is processed first before the **minimum room temperature** is active.
In combination with DDC sub-menu **15305 Optimize heating** - if the temperature conditions are appropriate - the movement switching is processed before the **ventilation optimization**.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5331	**Ziel** Destination startup Y	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5332	TA limit AF	set point float	0	12	8	C
5333	**b_r** Sensor back	actual value deletable float	-infinity	+infinity	deleted	C
5334	Limit T back AF	set point float	0	50	30	C
5335	Opening time	set point float	1	99	10	min
5336	Release delay	set point float	0	99	10	min
5337	Structure delay	set point float	0	99	10	min
5438	**EA** Source EA Start up	actual value deletable boolean	--	--	deleted	--
i022	**Anf** Start up	actual value boolean	--	--	0	--

4.3.2.9.5. S305 Optimization ventilation

Activation

Sub-function of	Basic PID program	can be set 1 x
Can be switched on-off via	**5348 Q EA OptAufh**	if not defined, ON

Function summary

The DDC sub-software object **Optimization (ventilation)** has the function of controlling the ventilation plant such that the desired room temperature is reached at the start of the usage time. Thus the **optimization (fan)** only works in automatic mode with a usage time assigned to the PID control.

This requires various parameters that represent the building's/room's temperature behavior and compares various temperatures with each other. This calculates time for the PID control to switch on.

Function description

For a difference in the outside temperature (**5103 Source TO**) from set point XS (**5100 XS**) in the PID basic program the switch on time for the assigned usage time program is brought forward. This applies both to necessary heating (TO < XS) and cooling (TO > XS).
The move forward is (XS-TO) * **5345 Fakt heat** for heating and (TO-XS) * **5346 Faktcool** for cooling. The maximum time change is stipulated in parameter **5343 Max time**.

The following is switched when the switch on time is moved forward:

- The optimization (ventilation) works on Y output in the PID basic program set in parameter **5342 Y outside air cover**. For this the Y output that controls the outside/recirculating air cover must be entered. By comparing the outside and room temperature energies the outside/recirculating air cover is opened or closed as per the need to heat / cool.
- The optimize status (ventilation) is indicated with the internal contact **I026 Optimization** = 1.
- The internal contact of the PID basic program **I011 plant ON** is switched to 1. This controls the ventilators. With the return message from the ventilators (via source parameter **5140 release control**) the internal contact **I012 control ON** is then switched to 1.
- If no Y output is selected in **5342 Y outside air cover** the optimization (ventilation) only switches the **I011 plant ON** signal on.
- The operation of the sub-menu can be switched ON or OFF via the binary source **5348 Q EA OptAufh**.

In order to ensure fast heating and cooling pure recirculating or outside air is used (without a minimum outside air rate) until the regular usage time start is reached.
During this time no limits in the PID basic program (Ymin, Ymax) work for the selected Y output. Limits that are subsequently switched by DDC software menus work.
All other Y outputs are controlled as per the current control parameter (xw, Ymin, Ymax).

Energy comparison, outside / recirculating air
(TR > XS) and (TO < TR) : outside air share 100%
(TR > XS) and (TO >TR) : outside air share 0 %

(TR < XS) and (TO >TR) : outside air share 100%
(TR < XS) and (TO <TR) : outside air share 0 %
with TR = room temperature, TO = outside temperature

Special Functions

If in addition DDC sub-menu **15304 start-up** is active the start-up switching must be processed first before **Optimize heating** works.

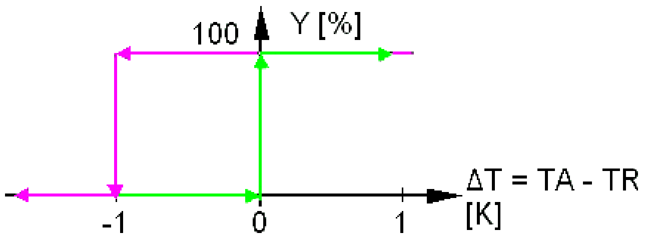
Parameters

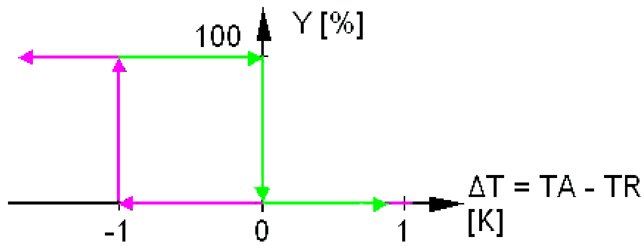
No.	name of parameter	parameter typ	min	max	init	unit
5341	**b_Rt** Room sensor opt.heating up	actual value deletable float	-infinity	+infinity	deleted	C
5342	Y outside air vent	set point deletable multistate	--	4	deleted	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5343	Max time	set point integer	10	600	30	min
5345	Fact Heat	set point integer	0	120	1	min/K
5346	Fact cool	set point integer	0	120	1	min/K
5348	**EA** Source EA opt.heating up	actual value deletable boolean	--	--	deleted	--
i026	Optimizing ventilation	actual value boolean	--	--	0	--

Additional information

A fixed switching difference of 1 K prevents the cover from being switched over continuously. However this hysteresis only works when comparing TO : TR.

Heating: TO < XS	Cooling: TO > XS
+ΔT (TR < XS) and (TO > TR): Y = 100 %	+ΔT (TR > XS) and (TO < TR): Y = 100 %
-ΔT (TR < XS) and (TO < TR): Y = 0 %	-ΔT (TR > XS) and (TO > TR): Y = 0 %

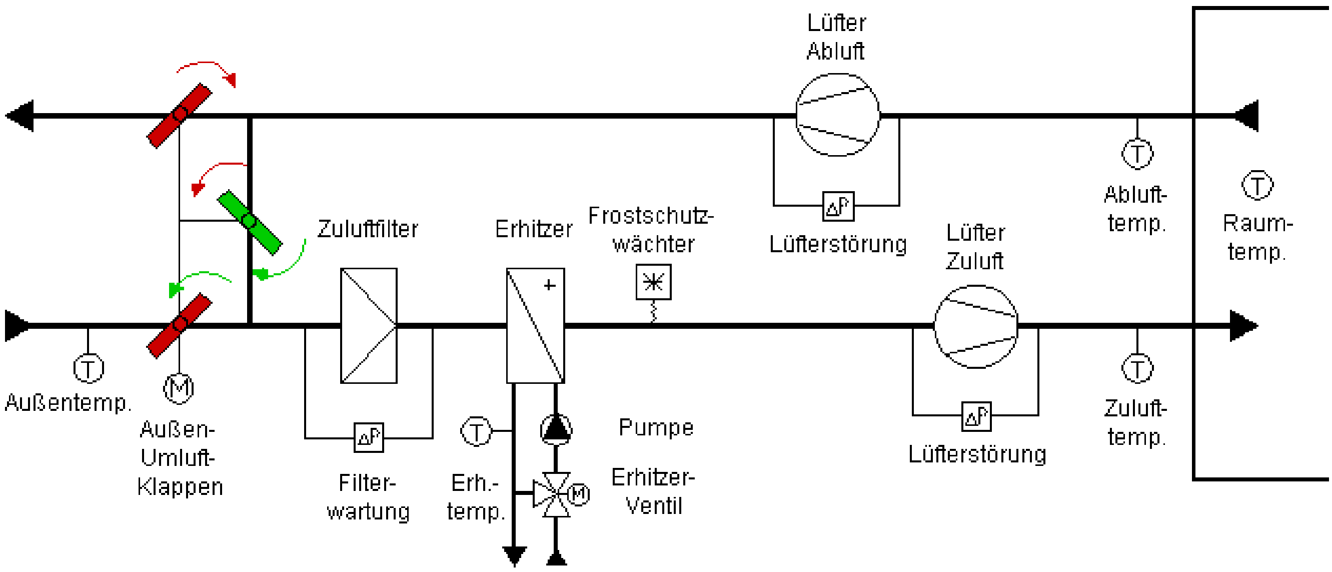




No hysteresis works when comparing TR : XS. The outside/recirculating air covers are switched immediately (0 Û 100 %) as soon as TX falls below or exceeds the set point XS.

No hysteresis works for the term (XS-TO)***Fakt heat** or (TO-XS)***Fakt cool**. If the TO varies it may occur that if the **Fakt heat** or **Fakt cool** value is high that optimization (ventilation) switches between on and off.

The outside temperature and set point **XSactual** are considered.



Y2 = 100 % ⇒ 100 % Außenluft
0 % Umluft

Y2 = 0 % ⇒ 0 % Außenluft
100 % Umluft

4.3.2.9.6. S306 Free night cooling

Activation

Sub-function of	Basic PID program	can be set 1 x
Can be switched on-off via	**5226 Q EA Free Night**	if not defined, ON

Function summary

Free night cooling for ventilation plants aims to release the heat in the building by inserting cool outside air at night. The function can only be used in summer.

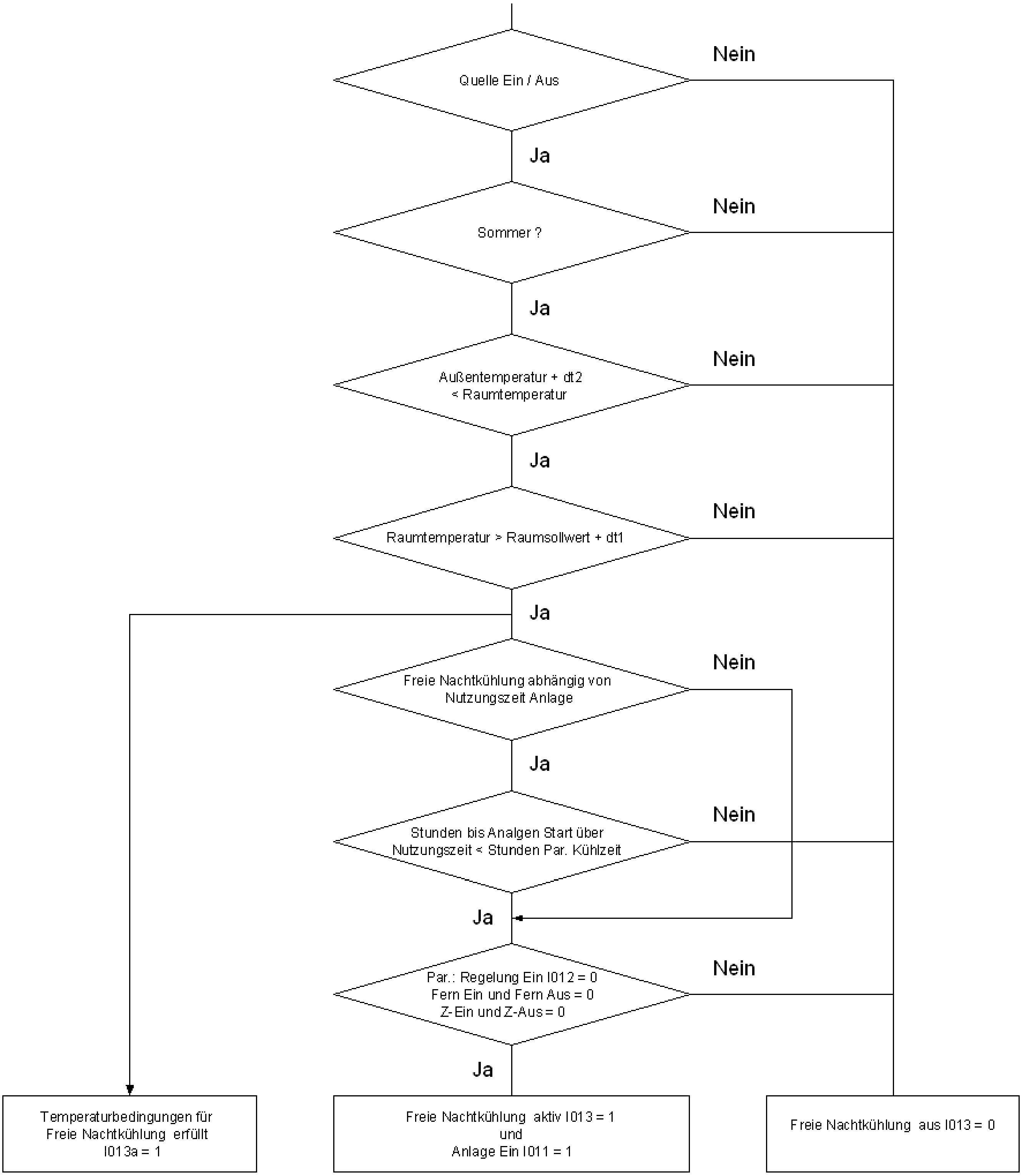
The PID basic program moves to " free night cooling" under the following conditions:

- The SWO function can be switched ON (Status = 1) or
  OFF (Status = 0) with a binary source. (**5226 Q EA Free Night**). Here for example using an annual program the menu function can be restricted to certain summer periods. If no binary source is set, the SWO is active.
- Summer operation in summer interval.
  If the average outside temperature **5169 TOaverage** exceeds the limiting value **5225 TO limit FN** it is assumed to be summer. The internal contact **I030 Summer FNK** switches to 1. The temperature of sensor **5103 Source TO** is analyzed as the outside temperature.
- The outside temperature is at least delta T2 **5223 dT2** lower than the room temperature.
- The room temperature is at least delta T1 **5222 dT1** larger than the current room temperature set point.
  The current set point **5101 XS current** from the PID basic program and the room temperature are analyzed in line with **5221 Room sensor FN**. If no separate room sensor is set the sensor value of the basic program **5102 source control variable** is analyzed.
  The room temperature must be above the current set point by **5222** dT1.
  Parameter I13a becomes logical 1 when the requests stated above are met. Parameter I13a can be be linked further in the DDC system. In contrast to parameter I13 it is not related to SWO PID.
- The configuration of the SWO free night cooling depending on the usage time of the SWO PID occurs using parameter **5227 observecoolingtime**.
  <u>Observe cooling time = Yes/---:</u>
  Free night cooling is only active if the remaining outstanding hours to the next plant start as per the set usage times is smaller than the value set in the cooling time parameter.
  <u>Observe cooling time = No:</u>
  Stated time conditions are switched off for free night cooling.
- The following status condition from the SWO PID must be met:
  <u>Control mode automatic OFF:</u>
  Info = 4
  I11 = plant ON = 0
  I12 = Control ON = 0
  <u>Automatic operation</u>
  Remote On = 0/9/---
  Remote Off = 0/9/---
  <u>Z- influence</u>
  Z- On = 0/9/---

Z-Off = 0/9/---

If all these requests are met the SWO free night cooling works on the relevant SWO PID by switching on the plant via parameter I11 and the regulator sequences are moved in line with the setting of parameter **YL Wahl FN**. The SWO PID does not go to normal operation.

Function of free night cooling



The following is switched by free night cooling:

- Free night cooling works on the Y outputs set in the PID basic program in parameter **5220 YL Choose FN**. These Y outputs are switched to 100%.
- The free night cooling mode is indicated by internal contact **I013 Free night cooling**.

- The internal contact of the PID basic program **I011 plant ON** is switched to 1. This controls the ventilators.

Resetting the free night cooling:

- The free night cooling stops if the values in parameters **T1 5222** dT1 or **5223 dT2** are lower than the fixed switch back difference of 2K or one of the other conditions is no longer met.

Priorities

Free night cooling is prioritized higher in night operation than the control function of the PID basic program.
In the PID basic program it is not switched to normal operation if the source **5140 Q release control** in the PID basic program is set to 1.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5220	YL select FN	set point selection list	--	--	2	selection list No.,text 0,for Y1 1,for Y2 2,for Y3 3,for Y4
5221	**b** Room probe FN	actual value deletable float	-infinity	+infinity	deleted	C
5222	**dT1** dT1	set point float	2	10	2	K
5223	**dT2** dT2	set point float	2	10	5	K
5224	Cooling time	set point integer	1	24	3	h
5225	**TAg** TA limit FN	set point float	0	25	17	C
5226	**EA** Q EA free Night	actual value deletable boolean	--	--	deleted	--
5227	Note cooling times	set point deletable boolean	--	--	deleted	--
i013	Free night cooling	actual value boolean	--	--	0	--
i013a	Free night cooling possible	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
i030	**So** Summer FNk	actual value boolean	--	--	0	--

4.3.2.9.7. S307 Constant frost protection

Activation

Sub-function of	Basic PID program	can be set 1 x
Can be switched on-off via	**5356 Q EA Frost protection stet**	if not defined, ON

Function summary

The role of the **ongoing frost protection** for ventilation plants is to prevent the heating register from freezing when the fans are running. For this the return temperature of the heating register is controlled separately in a settable range.

Function description

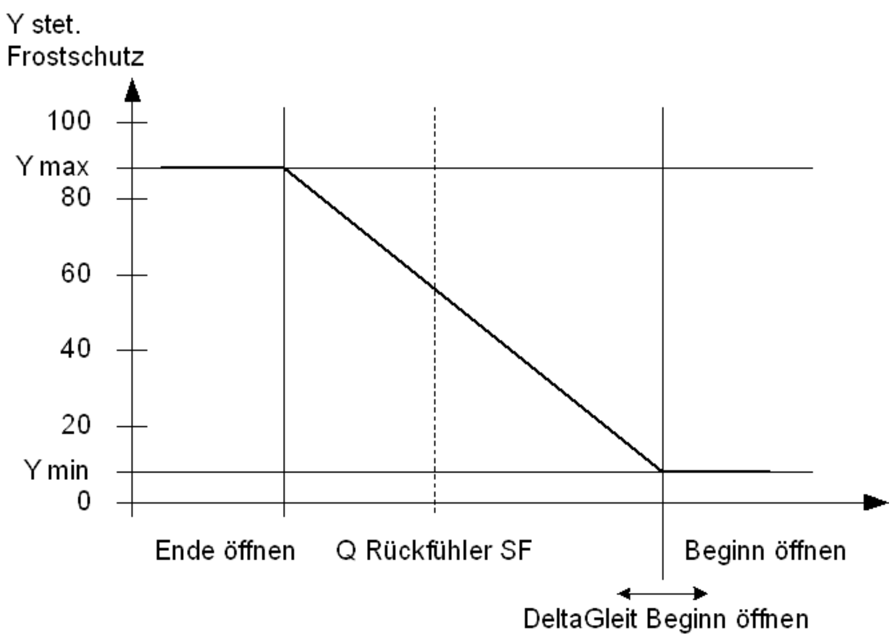
The software object operates if the PID basic program has the status "Control ON" **I012 = 1**.

The return temperature is set as source parameter **5352 Q return sensor SF**. The function of the ongoing frost protections constantly works on Y output set in parameter **5351 Y const. Frost protection**.

When the return temperature is lower than the **5353 Start to open** value, the Y output set in parameter **Y const. Frost protection** is controlled. The connected heating valve start to open.

If the return temperature falls below the **5354 End opening** value, the Y output (heating valve) is opened to the full. Both parameters **Start opening** and **End opening** therefore stipulate the proportional range for the heating valve for ongoing frost protection. The Y limits in the basic program (Y min, Y max) and sub-menu **Y-limit** continue to be operational.

If the return temperature reaches a value above **Start opening**, the control switches back to Y min.



In parameter **5355 deltaglide start opening** you can enter a source, e. g. from summer gliding in order to start the opening earlier depending on the outside temperature. For a lower outside temperature the heating register valve is then opened e g. from just 18 °C (for **deltaglide start opening** = 6 K + **Start opening** = 12 °C). **deltaglide Start opening** represent an offset by which **Start opening** is moved.
This enables you to avoid addressing the frost protection sensor at low temperatures.

(Note: In addition the return sensor can be delayed with a attenuation to slow down the menu)

Priorities

If the heating valve's Y output is controlled at the same time by regulating the basic program, the larger setting signal always takes effect, i. e. a MAX selection operates automatically.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5351	**Y** Cont. frost protection	set point multistate	--	4	0	value,text 1,for Y1 2,for Y2 4,for Y3 8,for Y4
5352	**b_r** Q back sensor SF	actual value deletable float	-infinity	+infinity	deleted	C
5353	Begin open	set point float	0	50	12	C
5354	End open	set point float	0	50	7	C
5355	deltaSlide begin opening	set point deletable float	-infinity	+infinity	deleted	K
5356	**EA** Q EA Frost prot. Cont.	actual value deletable boolean	--	--	deleted	--

Calculation

<u>Start opening < Q return sensor CF</u>

Y constant Frost protection = Y min

<u>End opening < Q return sensor CF < Start opening</u>

Y constant Frost protection = (start opening - Q return sensor CF) / (start opening - end opening - (Y max - Y min) + Y min

Q return sensor CF < End opening

Y constant Frost protection = Y max

Start opening NEW = Start opening + deltaglide start opening

4.3.2.9.8. S308 Minimum room temperature

Activation

Sub-function of	Basic PID program	can be set 1 x
Can be switched on/off via	**5364 Q EA minimum room temperature**	if not defined, ON

Function summary

The purpose of the minimum room temperature DDC software object for ventilation plants is to prevent excessive cooling at night and when the ventilation plant is switched off. I.e. the minimum room temperature works both in automatic mode out of usage time and when in off mode due to **remote OFF** or **Z contact OFF.**

Function description

It can be switched off using the binary source **Q_EA Minimum_Room temperature**.

To monitor the room temperature a sensor must be set in source parameter **Q Room sensor Min RT**. If the room temperatures fall below the set limiting value **TRlimit** the following is switched:

- The minimum room temperature works on the Y output in the PID basic program set in parameter **Y room**. This output is controlled as per the **XS current** from the PID basic program.
- The minimum room temperature status is displayed with the internal contact **Min TR = 1**.
- The internal contact of the PID basic program **plant ON** is switched to 1.
  This controls the ventilators. With the return message from the ventilators (via source parameter **Q release control**) the internal contact **Control ON** is then switched to 1.
  The related control however remains OFF, i.e. it only works on the Y output set in parameter **Y room.**

If the room temperature rises by 2K above **TRlimit**, the plant switches off again.

Transfer from Min room temp to day regulation:
If the circuit is in the Min room temp mode and the usage time assigned to the control circuit and/or the contact "Remote ON" is activated, the PID control circuit only moves to complete control operation when the room temperature exceeds **TRlimit** by 2K.

Special Functions

If in addition the DDC sub.software object S304 start-up is active, the start-up switching must first be worked through before the minimum room temperature is operational.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5361	Y room	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5362	**b** Q room probe min RT	actual value deletable float	-infinity	+infinity	deleted	C
5363	TR limit	set point float	5	50	10	C
5364	**EA** Q EA min RT	actual value deletable boolean	--	--	deleted	--
i014	Min RT	actual value boolean	--	--	0	--

4.3.2.9.9. S309 Standstill

Activation

Sub-function of	Basic program PID (ventilation)	3 times can be set
Can be switched on/off via	**5376 Q EA Standstill control**	

Function summary

The role of the standstill DDC sub-software object for ventilation plants is to prevent the heating register from freezing when the fans stand still. To do so from a particular outside temperature the return temperature of the heating register is controlled separately.

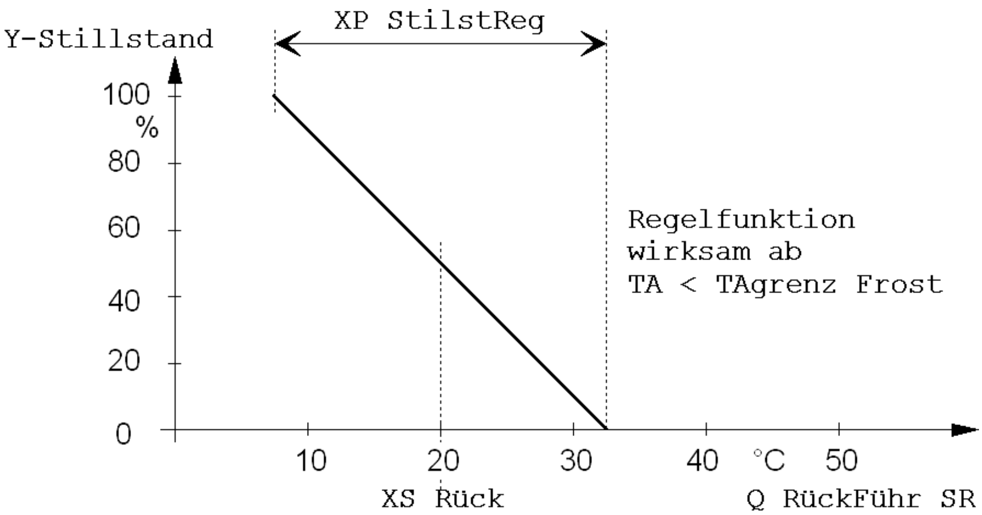
Function description

The DDC sub-software object is operational when the PID basic program has the status "Control ON" **I12 = 0**.

The outside temperature recorded in the basic PID program with source parameter **source TO** is compared with the limiting value set in **TOlimit Frost**. As soon as the outside temperature falls below this value a separate P control works on the PID control circuit's Y output set in parameter **Y standstill**. The connected heating valve start to open.
If no outside temperature sensor is installed (set) in the PID basic program the standstill control function is always active when "Control ON" is **I12 = 0**.

The separate P control for the heating valve regulates using a set point **XS return** and a proportional range **XP StillstReg**. The return temperature with the temperature sensor set in source parameter **Q return SR** is recorded as the current value for the P control.
If no return temperature sensor is installed (Set) the Y output is set to 100%.

If the outside temperature exceeds the value **TOlimit Frost** or the PID control is switched on **(I12 = 1)**, the control switches back to the original Y signal.
The Y limits in the basic program (Ymin, Ymax) and sub-menu Y-limit are not operational. It is always controlled from 0 .. 100 %.



Using the binary source in the **Q_EA Standstill** parameter the object's function can be switched on/off.

Priorities

If no outside temperature sensor **and** no return temperature sensor is installed (Set) the standstill regulation does not take place.

If several standstill controls work on one and the same Y output, the following priority applies:

Priority	Function
Highest	Standstill 1
	Standstill 2
lowest	Standstill 3

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5371.1	**Ziel** Y standstill	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5372.1	**b_r** Q back sensor SR	actual value deletable float	-50	150	deleted	--
5373.1	**TAg** TA limit Frost	set point float	0	20	3	C
5374.1	**XSr** XS back	set point float	2	50	10	C

No.	name of parameter	parameter typ	min	max	init	unit
5375.1	**XP** XP standstill reg	set point float	0,5	200	10	C
5376.1	**EA** Q EA standstill reg	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5371.2	**Ziel** Y standstill	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5372.2	**b_r** Q back sensor SR	actual value deletable float	-50	150	deleted	--
5373.2	**TAg** TA limit Frost	set point float	0	20	3	C
5374.2	**XSr** XS back	set point float	2	50	10	C
5375.2	**XP** XP standstill reg	set point float	0,5	200	10	C
5376.2	**EA** Q EA standstill reg	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5371.3	**Ziel** Y standstill	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5372.3	**b_r** Q back sensor SR	actual value deletable float	-50	150	deleted	--
5373.3	**TAg** TA limit Frost	set point float	0	20	3	C
5374.3	**XSr** XS back	set point float	2	50	10	C
5375.3	**XP** XP standstill reg	set point float	0,5	200	10	C
5376.3	**EA** Q EA standstill reg	actual value deletable boolean	--	--	deleted	--

4.3.2.9.10. S310 Energy selection

Activation

Sub-function of	basic ventilation program	0 ... can be set once
Can be switched on-off via	5238 Q EA Energy choice	if not defined, ON

Function summary

The choice of energy for ventilation plants selects the energy source that is most effective (cheapest) for the relevant control status.

Example: In line with the control status, cooling is to take place.
Therefore a choice is to be made as to whether the cooling takes place using the cooling register **or** whether any cool outside air is available that can be used for cooling. Then, for example, the air covers are switched appropriately.

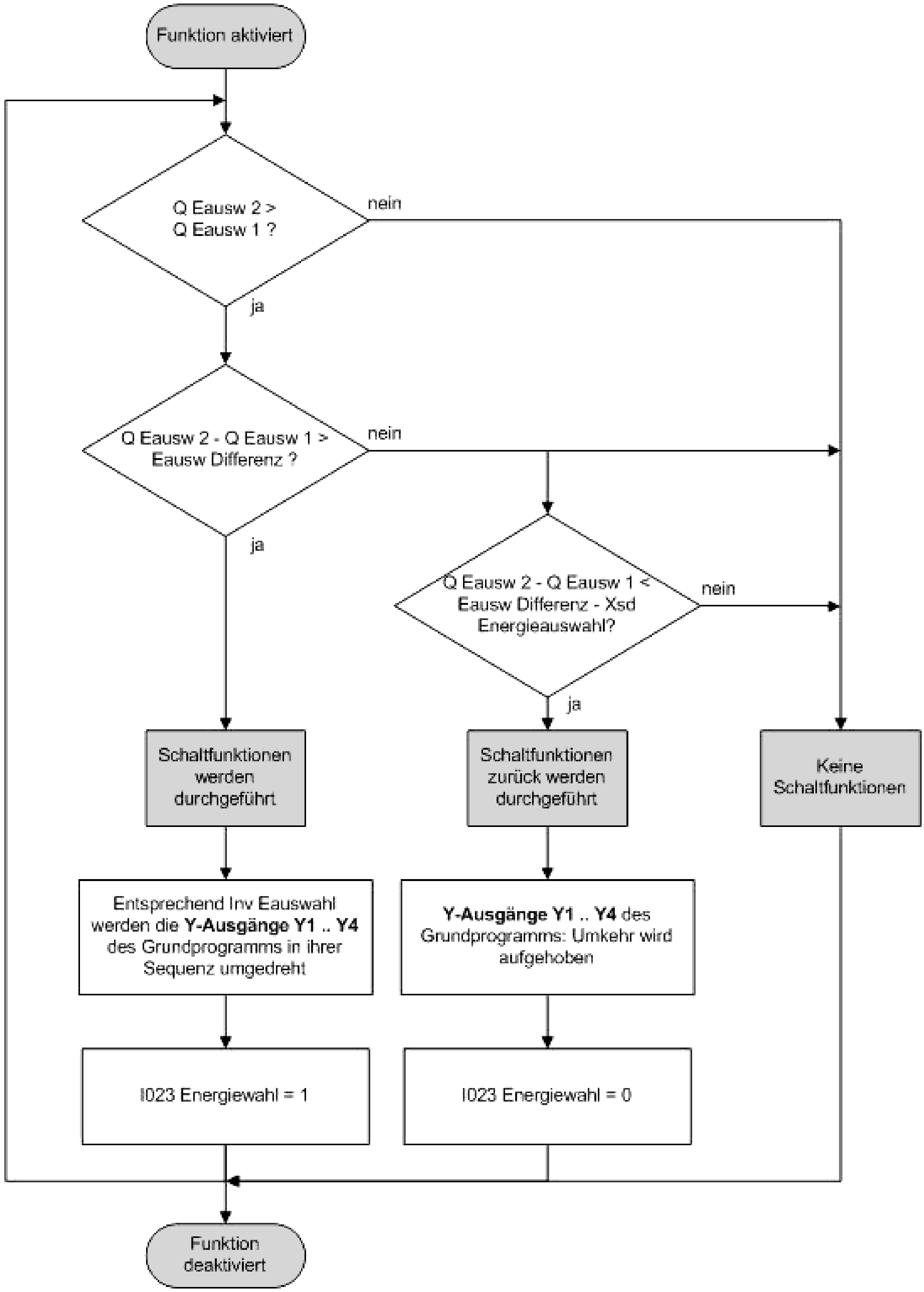
Example: In line with the control status, heating is to take place.
Therefore a choice is made as to whether the heating register is used for heating **or** whether any warm outside air may be used. Then the air covers are switched as appropriate.

Function description

The two analog values required for selecting the energy can be chosen freely as required. However they must be analog values with the same unit, e.g. two temperatures or two humidities.
To release the switch function the analog value **5231 Source ESelection 2** must be larger than the analog value **5230 Source ESelection 1**. If the difference of the two values is larger than the set point **5235 ESelcet Difference** the following switching functions are carried out:

- The effect of the Y output signals selected in parameter **5232 Inv ESelection** is inverted.
- The internal output **I023 Energy selection** is set.

If the different between the two analog values is less than the set point **ESelect Difference** by the return difference **Xsd Energy selection**, the Y output signals and the internal output **I23 Energy selection** are returned to their original status.

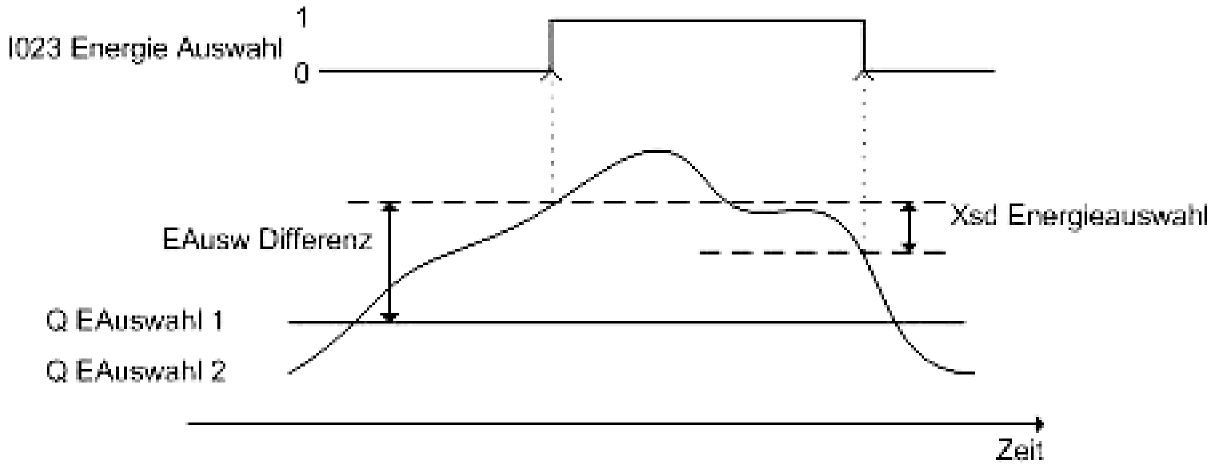

Funktion aktiviert
Q Eausw 2 >
Q Eausw 1 ?
nein
ja
Q Eausw 2 - Q Eausw 1 >
Eausw Differenz ?
nein
ja
Q Eausw 2 - Q Eausw 1 <
Eausw Differenz - Xsd
Energieauswahl?
nein
ja
Schaltfunktionen werden durchgeführt
Schaltfunktionen zurück werden durchgeführt
Keine Schaltfunktionen
Entsprechend Inv Eauswahl werden die **Y-Ausgänge Y1 .. Y4** des Grundprogramms in ihrer Sequenz umgedreht
Y-Ausgänge Y1 .. Y4 des Grundprogramms: Umkehr wird aufgehoben
I023 Energiewahl = 1
I023 Energiewahl = 0
Funktion deaktiviert

Summary:

Activate switching:
I023 = 1: Source ESelection 2 - Source ESelection 1 > ESelect Difference

No switching, switch back:
I023 = 0: Source ESelection 2 - Source ESelection 1 > ESelect Difference Xsd energy selection

Using the binary source in the **Q_EA Energy selection** parameter the object's function can be switched on/off. If no binary source is set the function can always operate.



Priorities

If the Y outputs in the PID basic program are analyzed in other DDC software objects (e.g. S322 sequence menu) the inverting also works on the following DDC software objects.
If at the same time the DDC sub-menu S311 Sequence converter is installed and active, the function of the DDC sub-menu S311 Sequence converter has a higher priority.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5230	**Q1** Source E Sel 1	actual value deletable float	-infinity	+infinity	deleted	--
5231	**Q2** Source E Sel 2	actual value deletable float	-infinity	+infinity	deleted	--
5232	**Inv** Inv select	set point selection list	--	--	0	selection list No.,text 0,for Y1 1,for Y2 2,for Y3 3,for Y4
5235	**diff** E Sel difference	set point float	0	20	1	--

No.	name of parameter	parameter typ	min	max	init	unit
5237	**xsd** Xsd Energy select	set point float	0	10	2	--
5238	**EA** Q EA Energy select	actual value deletable boolean	--	--	deleted	--
i023	Energy select	actual value boolean	--	--	0	--

4.3.2.9.11. S311 Sequence change

Activation

Sub-function of	Basic program PID (ventilation)	can be set 1 x

Function summary

The purpose of the sub-software object S311 sequence converter is to switch the operating direction of the Y outputs in the basic program depending on particular plant statuses.

Function description

In parameters **5240 source SP YL1** to **5243 source SP YL4** a binary source is set.

If the binary source signal switches from 0 to 1 or 1 to 0 the corresponding Y outputs YL1 to YL4 on the PID basic program are switched to inverted or back again. No inverting takes place if the binary source is invalid.

If access is made on the Y output in the PID basic program in other DDC software objects the inverted direction is adopted.

The limits of the Y outputs on the PID basic program **5141 Y1 min** to **5148 4 max** are still operational. E.g. if a Y output works with the limits 20 - 100 %, the inverted Y output also works with these limits.

Priorities

If the DDC sub-menu M310 energy selection is installed and active at the same time the function of the DDC sub-menu M311 sequence reversal is prioritized higher.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5240	**QY1** Source SU YL1	actual value deletable boolean	--	--	deleted	--
5241	**QY2** Source SU YL2	actual value deletable boolean	--	--	deleted	--
5242	**QY3** Source SU YL3	actual value deletable boolean	--	--	deleted	--
5243	**QY4** Source SU YL4	actual value deletable boolean	--	--	deleted	--

4.3.2.9.12. S312 Limitation

Activation

Sub-function of	basic heating and ventilation program	0 ... can be set 2 x
Can be switched on-off via	5279 Q EA limitation	if not defined, ON

Function summary

The DDC control function of the main control circuit is restricted using DDC software object limitation. The limitation is required for example:

- for keeping the supply air temperature in ventilation controls in comfortable limits
- to curb the supply temperature in heating controls before reaching technological limiting values.

A max or min limit is possible in line with the requests.
The max or min limits may glide in line with a command value. E.g. if for ventilation controls, beside lifting the room´s set point depending on the outside temperature, concurrently min limit of the supply air is lifted.

Function description

In the DDC software object limitation the selected limitation sensor in the source parameter **5270 Q limitation sensor** is set. The limitation value is set with parameter **5271 limitation value**. Parameter **5272 limitation** sets whether this is a max or a min limiting value.

The limitation works in the following 2 phases:

a) The value of the limitation sensor nears the max or min limitation value.
b) The value of the limitation sensor is higher or lower than the max or min limitation value.

Re a) the limitation function is adopted gliding. The variance of the limitation sensor to the limitation value is compared with the main control variance of the basic program. Depending on the relevant control variance control is still made with the main control circuit XP.

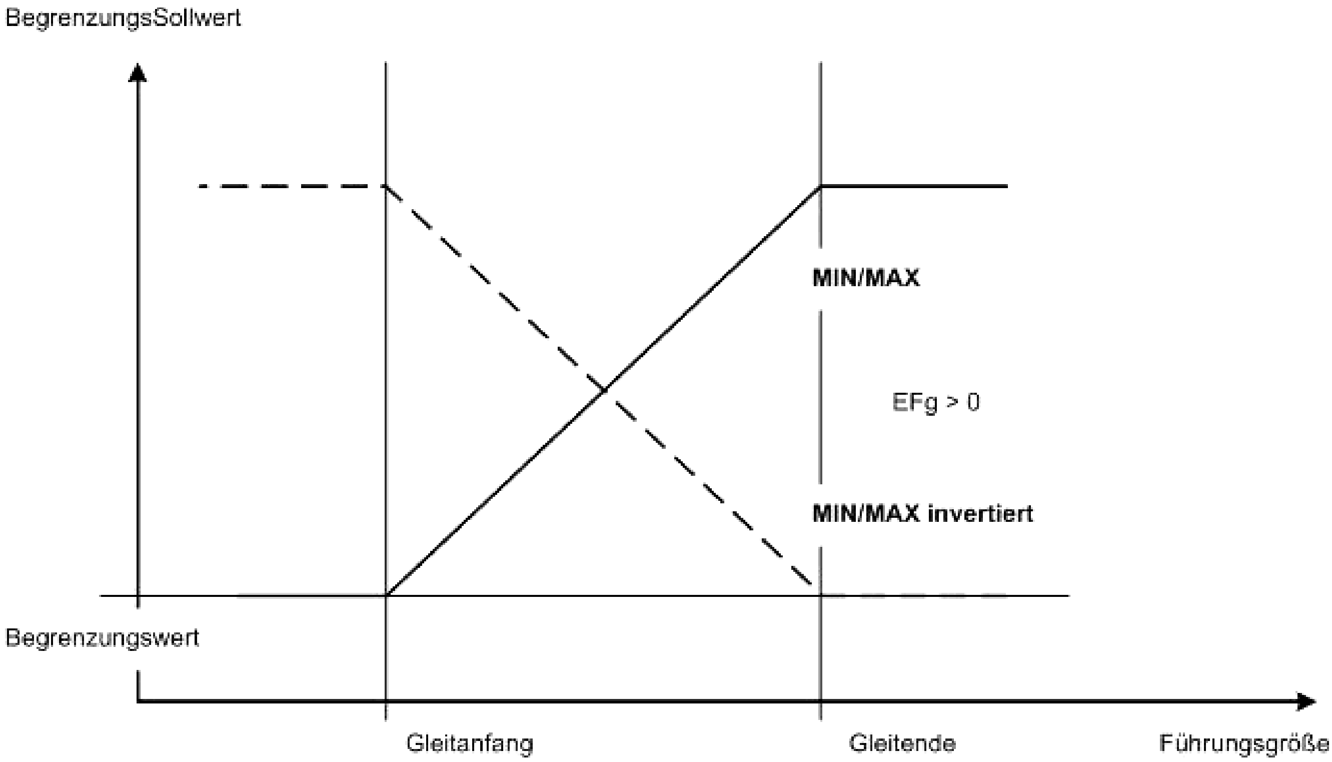
Re b) if the set Max limitation value is exceeded or the number falls below the min limitation value all XPs on the control circuit are replaced by **5273 XPlimitation** in order control the limitation value infringement as quickly as possible. This control status is indicated by switching the internal contact **V10 limitation** and **I020 XP switching** from "0" to "1".

Limiting value glide can occur for both the min. and max limiting values using command value source parameter **5275 command value limit**.

The range in which the min and max limits should glide is stipulated by parameters **5277 glide start limit** and **5278 glide end limit**. The influence of gliding is set by parameter **5276 EFg**. If **5276 EFg** = 0, glide does not occur.

If inverting is set winter compensation takes place, i.e. the limiting value is raised if the command value falls below the value of **5278 glide end limit**.

If no inverting is set summer compensation takes place, i.e. the limiting value is raised if the command value exceeds the value of **5277 glide start limit**.
This means that inverting exchanges internally to calculating glide stat and end. (Please refer to the end of the document for all glide calculations.)



When inverting the min limit (**Inv limit**) the effect of the limitation function is inverted (works like a max limit).

When inverting the max limit (**Inv limit**) the effect of the limitation function is inverted (works like a min limit).

Limitation	Inverting	XW calculation
Minimum	No	MIN (XWgp; XWbegr)
Minimum	Yes	MAX (XWgp; -XWbegr)
Maximum	No	MAX (XWgp; XW begr)
Maximum	Yes	MIN (XWgp; -XWbegr)

Priorities

The limit with the object index 10 is prioritized higher than the one with object index 02.

The limitation function of the DDC sub-menu limit has a higher priority than that of the DDC sub-menu XP switching. But the following functions are differentiated: XP change and XW change.

Priorities of the limitation function a) (change to the current control variance):

Priority	Function
Highest	**S312.1** Limitation 1
	S303 Cascade (only PID)
lowest	**S312.2** Limitation 2

The current control variance is determined as follows:

1. XWcurrent = Limitation 2 (XWbasic program, XWlimitation2)
2. XWcurrent = cascade (XWcurrent, XWcascade) (only PID)
3. XWcurrent = Limitation 1 (XWcurrent, XWlimitation1)

Priorities of the limitation function b) (change to the XP range):

Priority	Function
Highest	**S312.1** Limitation 1
	S312.2 Limitation 2
lowest	**S317** XP conversion

Parameters

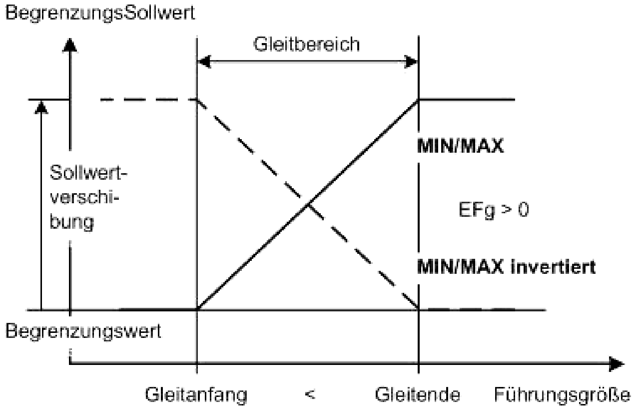
No.	name of parameter	parameter typ	min	max	init	unit
5270.1	**Q** Q limitation sensor	actual value deletable float	-infinity	+infinity	deleted	--
5271.1	Limitation value	set point float	-infinity	+infinity	150	--
5272.1	Limitation	set point multistate	--	2	1	value,text 0,Minimum 1,Maximum
5273.1	**XP1** XP limitation	set point float	0,5	200	10	--
5274.1	**inv** Inv. limitation	set point boolean	--	--	0	--
5275.1	**Q_Fg** Lead size limit	actual value deletable float	-infinity	+infinity	deleted	--
5276.1	**EFg** EFg	set point float	-10	10	0	--
5277.1	**Anf** Slide begin limit	set point integer	-50	150	22	--

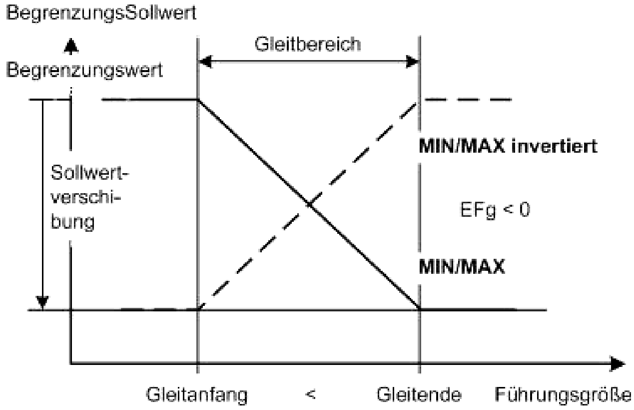
No.	name of parameter	parameter typ	min	max	init	unit
5278.1	**End** Slide end limit	set point integer	-50	150	32	--
5279.1	**EA** Q EA limitation	actual value deletable boolean	--	--	deleted	--
v10.1	Limitation	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5270.2	**Q** Q limitation sensor	actual value deletable float	-infinity	+infinity	deleted	--
5271.2	Limitation value	set point float	-infinity	+infinity	150	--
5272.2	Limitation	set point multistate	--	2	1	value,text 0,Minimum 1,Maximum
5273.2	**XP2** XP limitation	set point float	0,5	200	10	--
5274.2	**inv** Inv. limitation	set point boolean	--	--	0	--
5275.2	**Q_Fg** Lead size limit	actual value deletable float	-infinity	+infinity	deleted	--
5276.2	**EFg** EFg	set point float	-10	10	0	--
5277.2	**Anf** Slide begin limit	set point integer	-50	150	22	--
5278.2	**End** Slide end limit	set point integer	-50	150	32	--
5279.2	**EA** Q EA limitation	actual value deletable boolean	--	--	deleted	--
v10.2	Limitation	actual value boolean	--	--	0	--

Calculating the gliding of the target limitation value

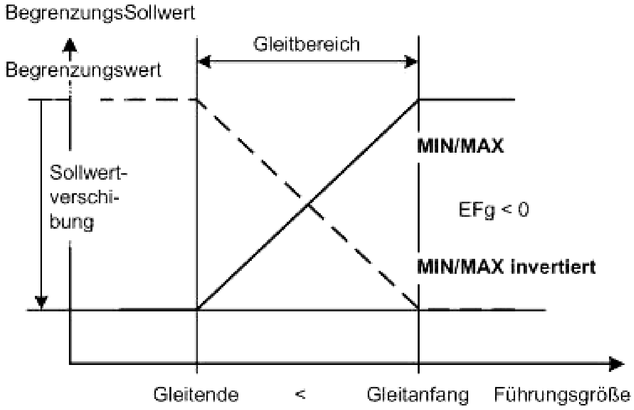
<u>glide start < glide end</u>

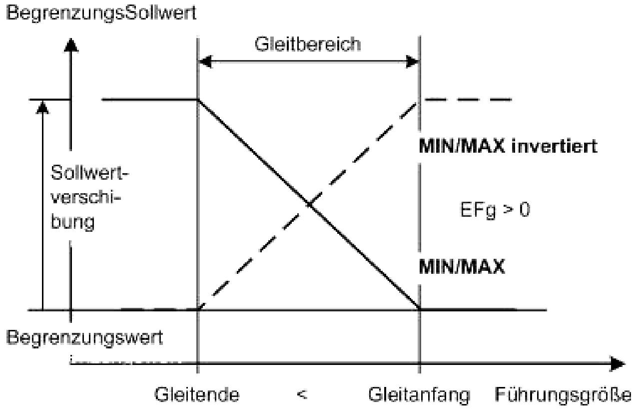




Invertierung ? JA		NEIN	
FührGr < Gleitanfang	BegrSoll = BegrWert + (Gleitende - Gleitanfang) * EFg	FührGr < Gleitanfang	BegrSoll = BegrWert
Gleitanfang < Führgr < Gleitende	BegrSoll = BegrWert + (Gleitende - FührGr) * EFg	Gleitanfang < Führgr < Gleitende	BegrSoll = BegrWert + (FührGr - Gleitanfang * EFg
Gleitende < Führgr	BegrSoll = BegrWert	Gleitende < Führgr	BegrSoll = BegrWert + (Gleitende - Gleitanfang) * EFg
XW_{Begr} = BegrFühl - BegrSoll			

<u>glide end < glide start</u>





Invertierung ?

JA		NEIN	
FührGr < Gleitende	BegrSoll = BegrWert	FührGr < Gleitende	BegrSoll = BegrWert + (Gleitanfang - Gleitende) * EFg
Gleitende < Führgr < Gleitanfang	BegrSoll = BegrWert + (FührGr - Gleitende) * EFg	Gleitende < Führgr < Gleitanfang	BegrSoll = BegrWert + (Gleitanfang - FührGr) * EFg
Gleitanfang < Führgr	BegrSoll = BegrWert + (Gleitanfang - Gleitende) * EFg	Gleitanfang < Führgr	BegrSoll = BegrWert

XW_{Begr} = BegrFühl - BegrSoll

4.3.2.9.13. S313 SP switching

Activation

Sub-function of	basic heating program and PID	0 ... 4 can be set
Can be switched on-off via	**5288 Q EA Special target**	if not defined, ON

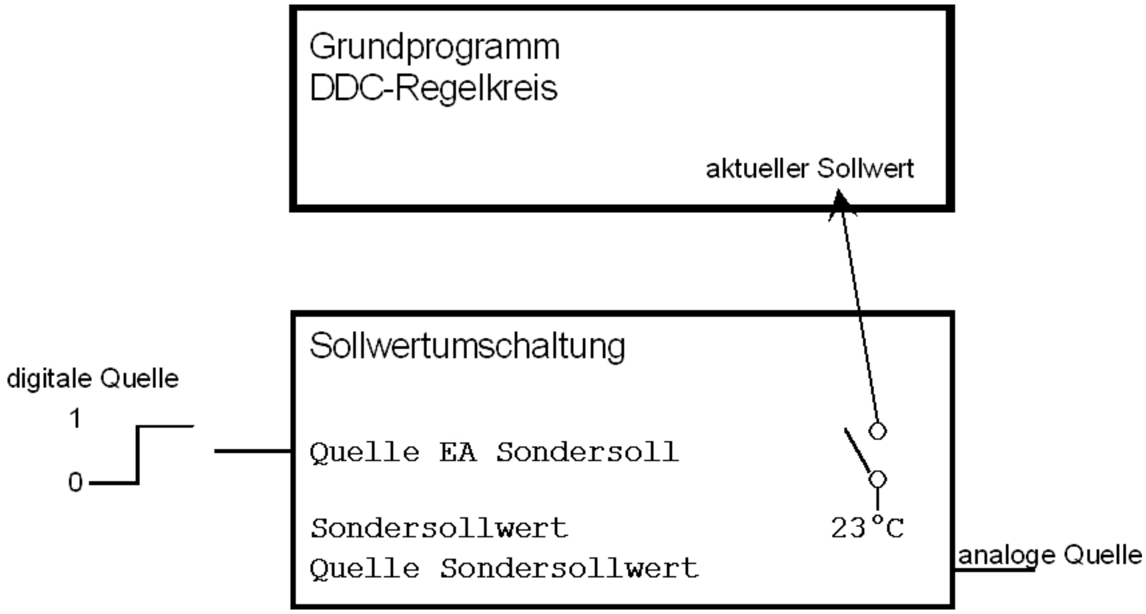
Function summary

In the DDC software object S313 set point switching a constant is defined that replaces the set point of the DDC control circuit depending on a binary source. In addition any analog value can be assigned as a set point via an analog source.

Function description

In the DDC software object set point switching an analog value is set from a source, parameter **5285 Q Special set point** (e.g. a characteristic value) or a constant, parameter **5286 Special set point**. The value of the analog source has a higher priority than the constant.

Depending on a binary source, parameter **5287 Q EA special set point** replaces the value of the analog source or the constants the set point of the DDC control circuit.



It is possible to delay switching between the values. Parameter **5287 slope special set point** is used for this. The number of K/min by which the set point may change at most can be entered here.

Switching to the special set point can be switched ON or OFF via the binary source (**5288 Q O special target**). If parameter **5287 slope special set point** has a valid value entered, changes to the set point in the basic program (e.g. day/night set point in basic heating program) is always accompanies by a time delay for an active "Menu SPSW". The slope with the highest priority is operational (object index 1 before 2 before 3 before 4).

Priorities

Object index 1 has the highest priority, menu index 4 has the lowest priority.

1. Set point switching 1 15313.1
2. Set point switching 2 15313.2
3. Set point switching 3 15313.3
4. Set point switching 4 15313.4
5. Set point remote control 15316
6. Set point correction 15315

Note

Basic heating program:
In the basic heating program the set point switching replaces the calculate **TStarget current** from the basic program or the target room value **TR target** for the set DDC sub-menu 15318 room correction and/or 15300 optimize. Switching to a firm **TS target/TR target** excludes night falls. If the optimize sub-menu is active the new **TR target** influences intermediate heating, pre-lowering, preset, the heating up time and the adaptions.

Basic PID program:
In the PID basic program for active set point switching the current set point XS current is overwritten. If in addition to the basic program the DDC software object S314 set point glide also works this calculated XS current is overwritten.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5285.1	**Q-XS** Q Sondersollwert	actual value deletable float	-50	150	deleted	C
5286.1	**XS** custom setpoint	set point float	-50	150	0	C
5287.1	**K/min** Q EA custom setpoint	set point deletable float	0,1	60	deleted	K/min
5288.1	**EA** Q EA custom setpoint	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5285.2	**Q-XS** Q Sondersollwert	actual value deletable float	-50	150	deleted	C
5286.2	**XS** custom setpoint	set point float	-50	150	0	C
5287.2	**K/min** Q EA custom setpoint	set point deletable float	0,1	60	deleted	K/min

No.	name of parameter	parameter typ	min	max	init	unit
5288.2	**EA** Q EA custom setpoint	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5285.3	**Q-XS** Q Sondersollwert	actual value deletable float	-50	150	deleted	C
5286.3	**XS** custom setpoint	set point float	-50	150	0	C
5287.3	**K/min** Q EA custom setpoint	set point deletable float	0,1	60	deleted	K/min
5288.3	**EA** Q EA custom setpoint	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5285.4	**Q-XS** Q Sondersollwert	actual value deletable float	-50	150	deleted	C
5286.4	**XS** custom setpoint	set point float	-50	150	0	C
5287.4	**K/min** Q EA custom setpoint	set point deletable float	0,1	60	deleted	K/min
5288.4	**EA** Q EA custom setpoint	actual value deletable boolean	--	--	deleted	--

4.3.2.9.14. S314 Set point glide

Activation

Sub-function of	Basic PID program	can be set 1 x
Can be switched on-off via	**5254 Q EA Gliding**	if not defined, ON

Function summary

The function of the DDC sub-software function set point glide is to allow the set point to glide with a command value. At the same time a range in which the glide is permitted can be set.

Function description

A guidance signal parameter **5250 command value SG** the current set point
5101 XS current in the PID basic program is raised or lowered. Any analog value in the DDC4000 system (e.g. outside temperature) can be selected as a guidance signal.

The command value only results in a change to the set point within a glide range. The glide range is stipulated by the parameters **5251 glide start SG** and **5252 glide end SG**.

The influence of the guidance signal on the limiting value change is determined with the parameter **5253 INF**. If Inf is negative this can force a reduction in the set point.

Parameter **5255 Delta SP gliding** is an actual value and shows the difference of the current set point that results from the DDC sub-menu set point gliding.

The function of the DDC software object can be switched ON (Status = 1) or OFF (Status = 0) with a binary source (Status = 0). (**5254 Q EA Gliding**)
If no binary source is set the function is switched to ON.

Based on the start and end of glide-ing the following calculation arises for the set point gliding:

glide start < glide end
  comvalue < glide start: Delta_glide = 0
  glide start< comvalue < glide end: Delta_glide = EF * (comvalue - glide start)
  glide end < comvalue: Delta_glide = EF * (glide end - glide start)

glide end < glide start
  comvalue < glide end: Delta_glide = EF * (glide start - glide end)
  glide end < comvalue < glide start: Delta_glide = EF * (glide start - comvalue)
  glide start < comvalue: Delta_glide = 0

Set point = XS current (basic program) + Delta_glide

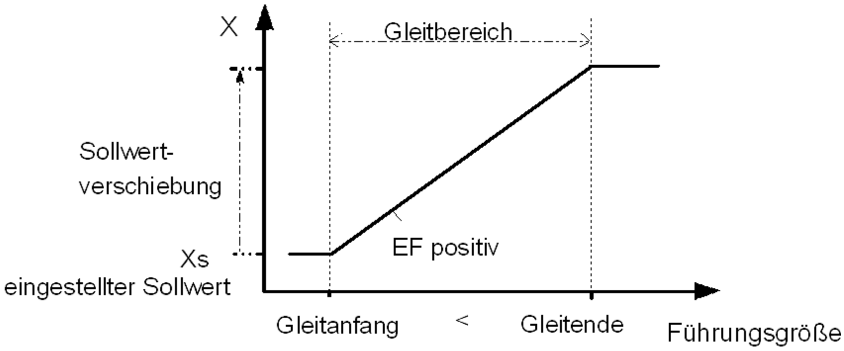
command value < glide start : Set point = XS (basic program)

glide start < command value < glide end : Set point = XS (basic program) + Delta_glide
  Delta_glide = EF * (comvalue - glide start)

glide end < comvalue: Set point = XS (basic program) + Delta_glide
Delta_glide = EF * (glide end - glide start)

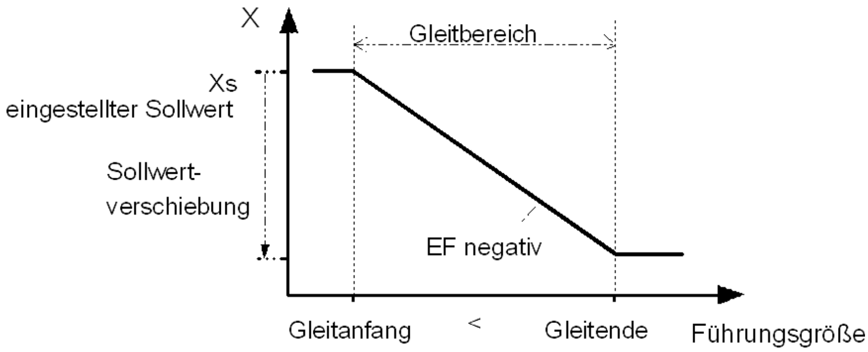
a) Set point raised for increased command signal and positive EF value

Setting:
glide start SG1 < glide end SG1
EF = positive value



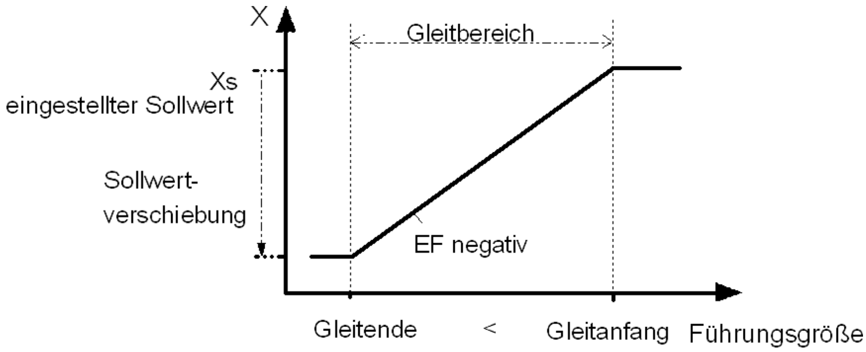
a) Set point lowered for increased command signal and negative EF value

Setting:
glide start SG1 < glide end SG1
EF = negative value



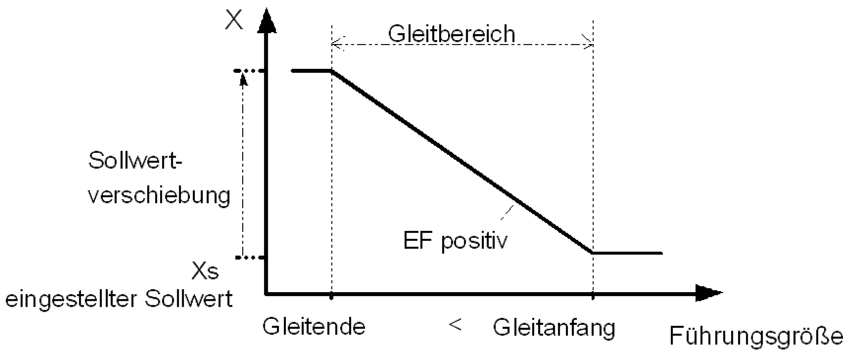
c) set point lowered for falling command signal and negative EF value

Setting
glide start SG1 > glide end SG1
EF = negative value



a) Set point raised for falling command signal and positive EF value

Setting
glide start SG1 > glide end SG1
EF = positive value



Example: Gliding as per AT
Set point movement from 20 °C to 25 °C = 5K
glide range (AT) from 22 °C to 32 °C = 10K
EF - Influence guidance signal 5K|10K = 0.5

The DDC sub-software object set point glide not only works on the XSactual, but also moves the supply air min. limitation of the cascade if **parameter 5207 gliding cascade** is set to "YES".

Note

On the PID basic program for active set point glide the current set point **XS current** is overwritten.

Priorities

If in addition to the basic program the DDC sub-menu cascade is also working the supply air min limit is moved by the same amount at the same time if parameter **5207 gliding cascade** is set to "yes".

If in addition to the basic program the DDC sub-menu set point switching is also operational than only the set point switching is operational.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5250	Lead size SG	actual value deletable float	-infinity	+infinity	deleted	--
5251	**Anf** Slide start SG	set point float	-infinity	+infinity	22	--
5252	**End** Slide end SG	set point float	-infinity	+infinity	32	--
5253	**EF** EF SG	set point float	-10	10	0,5	--
5254	**EA** Q EA sliding	actual value deletable boolean	--	--	deleted	--
5255	**Delta** Delta SW sliding	actual value float	-infinity	+infinity	0	--

4.3.2.9.15. S315 Set point correction

Activation

Sub-function of	basic heating program and PID	0 ... can be set once
Can be switched on-off via	**5292 Q EA Target correction**	if not defined, ON

Function summary

DDC software object S315 address an analog source to which the set point correction control is connected or from which any analog value can be read. This analog value works as a correction on the DDC control circuit set point.

Function description

Parameter **source target correction 0..100 %** sets the analog value of a set point correction control or any analog value of the DDC4000 system. The value range produced by this analog source is interpreted as 0 ... 100%. (Effect like **source target correction** in the DDC3000)

The value range for the set point correction is set with parameters **upper limit release SPC** and **lower limit release SPC**. The measuring unit of this range is matched automatically to the measuring unit of the set point being corrected.

SPC = (release SPC UL - release SPC LL) / 100 * Q SPC (in 0..100 %) + release SPC LL

Parameter **source target correction absolute value** sets the analog value of a set point correction control or any analog value of the DDC4000 system. The value range produced from this analog source is processed as a real value, e.g. -5..5 K.

The imported value is kept in the **upper limit release SPC** and **lower limit release SPC** limits. Higher/lower values are cut off. The source **target correction absolute value** has a higher priority than **source target correction 0..100 %.**

The function of the DDC sub-menu can be switched ON (Status = 1) or OFF (Status = 0) with a binary source. (**Q EA Target correction**)
If no binary source is set the function is switched to ON.

Priorities

If in addition to the DDC software object set point correction a DDC software object set point switching and/or set point remote control is active, the following priorities apply:

Priority	Function
Highest	Set point switch 1 **S313.1**
	Set point switch 2 **S313.2**

Priority	Function
	Set point switch 3 **S313.3**
	Set point switch 4 **S313.4**
	Set point remote control **S316**
lowest	Set point correction **S315**

Example

DDC control circuit set point to be corrected	Lower limit SPC release	Upper limit SPC release	valid range for a set point correction
20°C	-4	6	16 °C to 26 °C
5mBar	0	2	5 mBar to 7 mBar

Note

Basic heating program:
The DDC submenu set point correction only works for "day regulation".
The set point correction influences KH (parallel movement of heating curve) if the DDC sub-menu 15318 room correction or 15300 optimization is not active.

TStarget new = TStarget + target correction

If DDC room correction or optimize sub-menus are active the room set point **TRtarget** is changed by the set point correction. This, for example, influences the economy function and the start set point for active room correction.

TRtarget new = TRtarget + target correction

Room correction: TStarget new = TStarget -(Roomtemp – TRtarget new) * ER correction

Optimization: NO TStarget correction

Basic PID program:
In this basic program the set point correction works on the current set point **XS current**.
XS current new = XS current + target correction

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5290	**Q100** Q EA Setpoint Correction	actual value deletable float	0	100	deleted	%

No.	name of parameter	parameter typ	min	max	init	unit
5291	**Q** Source Setpoint Correction	actual value deletable float	-infinity	+infinity	deleted	--
5292	**EA** Q EA Setpoint Correction	actual value deletable boolean	--	--	deleted	--
5293	release SWK	set point float	-infinity	+infinity	-5	K
5294	Release SWK above	set point float	-infinity	+infinity	5	--

4.3.2.9.16. S316 Set point remote control

Activation

Sub-function of	Heating and ventilation basic program	0 ... can be set once
Can be switched on-off via	5238 Q EA Energy choice	if not defined, ON

Function summary

DDC software object set point remote control addresses an analog source to which the set point correction control is connected or from which any analog value can be read.

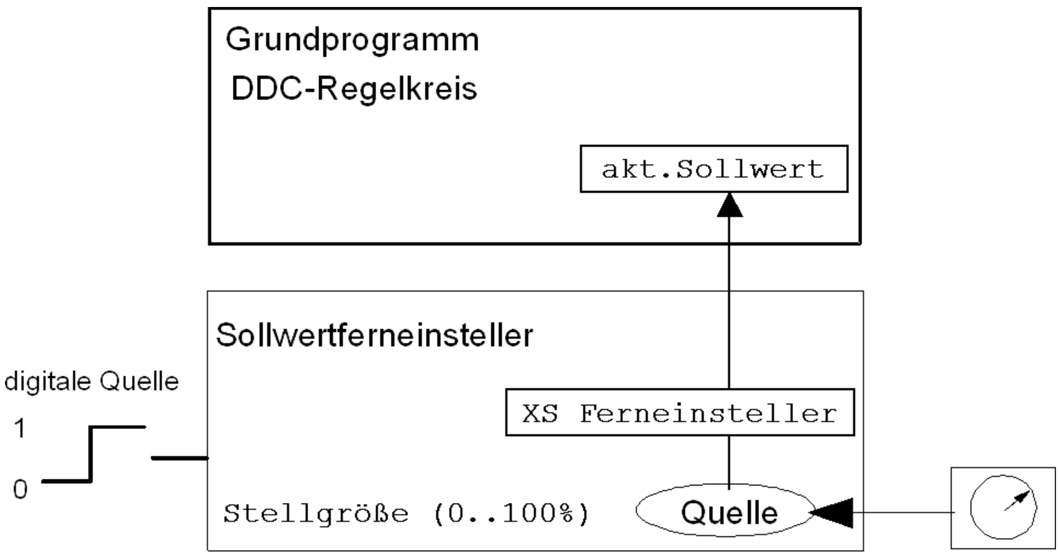
Function description

Parameter **5260 actuating variable** sets the value of a set point control or any analog value of the DDC4000 system whose value range was previously scaled to 0 .. 100%.

The value range for the set point remote setting is set with parameter **5261 Start remote** and parameter **5262 End remote**. The measuring unit of this range is matched automatically to the measuring unit of the set point being set.

The calculated set point is depicted on parameter **5265 XS remote control**. This analog value replaces the set point of the DDC control circuit.

The function of the sub-menu can be switched ON (Status = 1) or OFF (Status = 0) with a binary source.
(Status = 0). (**Q EA TargetRemote)**
If no binary source is set the function is switched to ON.



Priorities

If in addition to the DDC software object set point remote control a DDC software object set point switching and/or set point correction is active, the following priorities apply:

Priority	Function
Highest	**S313.1** Set point switch 1
	S313.2 Set point switch 2
	S313.3 Set point switch 3
	S313.4 Set point switch 4
	S316 Set point remote control
lowest	**S315** Set point correction

Example:

5261 Start remote	5262 End remote		5265 XS remote control at 0 ..100% value change
10 °C	25 °C		10 °C .. 25 °C
20 %rF	80 %rF		20 %rF .. 80 %rF
0 mBar	5 mBar		0 mBar .. 5 mBar

Note

<u>Basic heating program:</u>
The DDC submenu set point correction only works for "day regulation".

The set point correction influences KH (parallel movement of heating curve) if the DDC software object S318 room correction or S300 optimization is not active.

TStarget correction = XS remote control = (End remote - start remote) * actuating variable / 100 % + start remote

TStargetnew = TStarget + TStarget correction

If the DDC software object room correction or optimize are active the room set point **TRtarget** is changed by the **XS remote control**. This, for example, influences the economy function and the start set point for active room correction.

Room correction: TStargetcorrection = (Room temp - XS remote control) * ER

Optimization: NO TStarget correction

<u>Basic PID program:</u>
In this basic program the set point remote control works on the current set point **XS current**.

XS current = XS remote control = (End remote - start remote) * actuating variable / 100 % + start remote

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5260	Set size	actual value deletable float	0	100	deleted	--
5261	**Anf** Begin remote	set point integer	-2147483648	2147483647	0	--
5262	**End** End remote	set point integer	-2147483648	2147483647	50	--
5263	**EA** Q EA setpoint remote	actual value deletable boolean	--	--	deleted	--
5265	XS Remote setting	actual value float	-infinity	+infinity	0	--

4.3.2.9.17. S317 XP switching

Activation

Sub-function of	basic heating program and PID	0 ... can be set once
Can be switched on-off via	5306 Q XP switching	if not defined, ON

Function summary

DDC control circuit control setting parameters are switched with the DDC sub-menu XP switching. Depending on a binary source the proportional ranges of the Y outputs, the rate and regulating periods can be switched.

Function description

The binary source is set in parameter **source XP switching**.
If the digital source **Q XP switching** is "1" or "---" the controller setting parameters are replaced by the set setting values.
The working XP switching is displayed via internal contact **I20 XP switching** in the basic heating program or PID.

Note:
In the basic heating program **I20 XP switching** only becomes "1" if XPY1 changes. Only changes **TN New** and/or **rate New**; **I20 XP switch** remains "0". **I20 XP switch** can also be "1" as a result of a limit.

Priorities

The DDC sub-menus limitation menus 1 and 2 work before the XP switch.

Priority	Function
Highest	Limitation 1 **S312.1**
	Cascade (only PID) **S303**
	Limitation 2 **S312.2**
	XP switching **S317**
lowest	Structure delay start-up **S304**

Special Functions

Depending on the reset time **tN** set in the basic program the
XPY (basic program) is switched to the XPY (XP switching) gliding and vice versa.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5300	**XPY1** XPY1 New	set point float	0,5	999,9	50	K
5301	**XPY2** XPY2 New	set point float	0,5	999,9	50	K
5302	**XPY3** XPY3 New	set point float	0,5	999,9	50	K
5303	**XPY4** XPY4 New	set point float	0,5	999,9	50	K
5304	**tN** Tn New	set point deletable float	0,5	99	3	min
5305	**d** Vorhalt	set point deletable integer	1	99	deleted	s
5306	**Q** Q XP change overR	actual value deletable boolean	--	--	deleted	--
i020	XP Changeover	actual value boolean	--	--	0	--

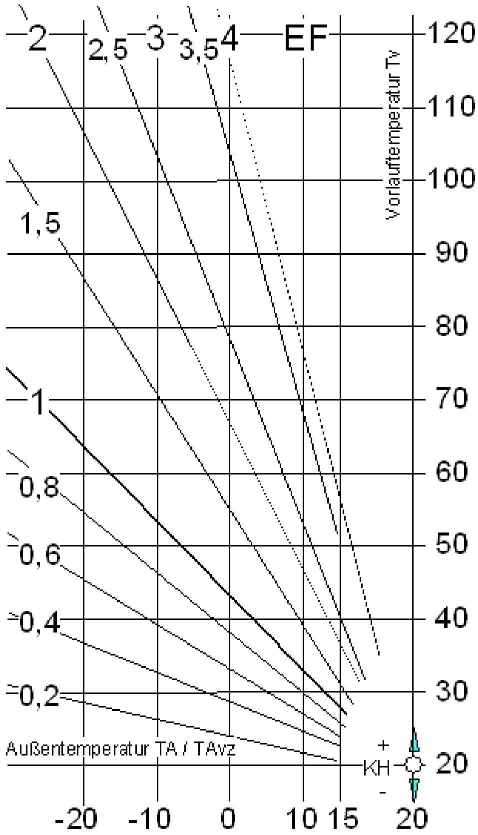
4.3.2.10. S239 Basic program heating

Activation

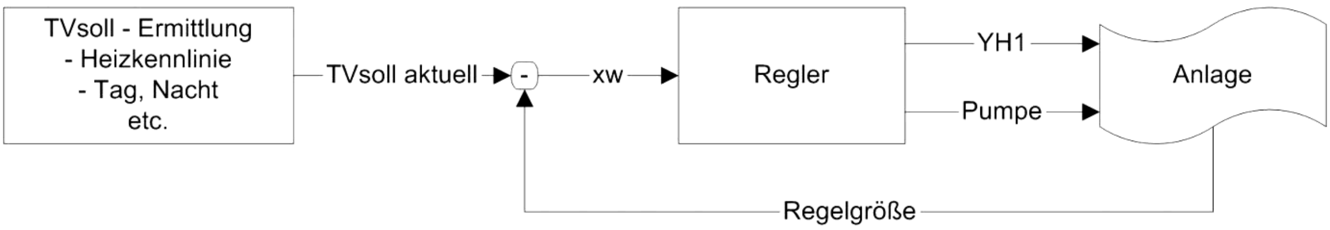
Basic program	-	can be set 12 times

Function summary

The basic heating program is weather-oriented supply temperature control with a constant Y output. Function extensions are made via DDC software and hardware objects.



Function description



4.3.2.10.1. Graphical summaries

Basic function

The supply temperature, as a control variable, must be defined in parameter **5102 source control variable**. Any DDC4000 system analog value can be set.

The command of the warm-up set point occurs as per the delayed outside temperature. The calculated delayed outside temperature is depicted on parameter **5153 TOvz**. The average outside temperature is output on **5169 TOaverage**. The delay with which the **TOvz** outside temperature follows can be set via parameter **5168 time constants TOvz**. If the starting set point is guided by the actual outside temperature parameter **5152 Rules as per TO** must be set to "YES".
As an outside sensor, any analog value in the DDC system can also be set in parameter **5103 source TO**.

As per the heating curve (refer to image) with the set values **5155 EF** and **5156 KH** the heating control circuit calculates a start set point.

On the basis of this set point and the function of other DDC sub-menus (e.g. **S314 set point switching**) a new set point is calculated that is depicted as the current value on parameter **5151 TStarget current**.

Minimum and maximum limits for the supply temperature are set in parameters **5165 TS min** and **5166 TS max**.
The basic heating program sets the control states day regulation and night rules set points for the start. For night rules the supply temperature is lowered to a value set in parameter**5167 TS abs**.

TS target calculation
TO(vz) < 15 °C: TStarget day = 20 + KH - EF * (TO(vz) -24)
TO(vz) **m³** 15 °C: TStarget day = 20 + KH - EF * (1.8 * TO(vz) - 36)
TStarget night = TStarget day + TS abs

For setting the heating control parameter **5120 XPY1** to set the P-share, **5106 TN** to set the I-share and **5125 rate** to set the D share are used. The control variance (control variable - TStarget current) is displayed in parameter **5105 XW**.

Parameter **5128 xwh** sets a non-sensitive zone, i.e. within xw=0 +/- xwh the Y output is not changed. If xw exceeds this range the control is normal.

The basic heating program has a constant Y output. The Y output calculated from the basic program can be overwritten through BMS influence, manual intervention or through DDC sub-menus (e.g. **S302 Y-Set**). The current calculated value for the Y output is between 0...100 % and is displayed on parameter **5173 YH1**.
The output of the Y output values occurs via source parameterizing in the basic programs of the DDC Central Units (DDC4000) and the DDC modules (DDC bus module BMA, BMD, field bus module FBM, control cabinet bus module SBM).

For the Y output it is possible to set a max and a min limit, parameters **5141 Y1 min** and **5145 Y1 max**.

Through central unit influence, remote control or usage time programs you can switch between different control statuses (day regulation, night rules, OFF, heat up, auto) in the basic heating program. The resulting DDC control circuit statuses are shown via internal contacts: **I004 day regulation, I005 night rules, I007 heat up and I009 control status OFF**. This and other internal contacts can be used for other links in the PLC.

Internal contact parameter **I001 Pump** switches on the pump of the heating circuit. It is switched off with a hunting time as per parameter **5182 pump hunting**.

Internal contact parameter **I003 boiler request** displays the boiler request. In control operation and in combination with the DDC software object **S300 Optimize heating** it is set when heating and intermediate heating.

Priorities

Basic heating program, switch control statuses

Priority	Function	Comment
Highest	**5175**Source remote control	If the **source remote control** is not set or set to **auto**, the basic heating program depends on any remote control by a BMS or the assigned usage time program.
	Z Z contacts	If the Z contacts are not influenced or the Auto state set the basic heating program depends on the assigned usage time program.
lowest	**Q_N** Schedule object S118	If no time program is assigned to the basic heating program day regulation are used.

Function description extended functions

Reducing the start -up lowering

For particularly low outside temperatures the value for night falling can be reduced automatically in order to avoid excessive room/building cooling. This ensures that the rooms can be heated up to the target temperature.
The range for automatically reducing the lower start set point for night rules is stipulated by:

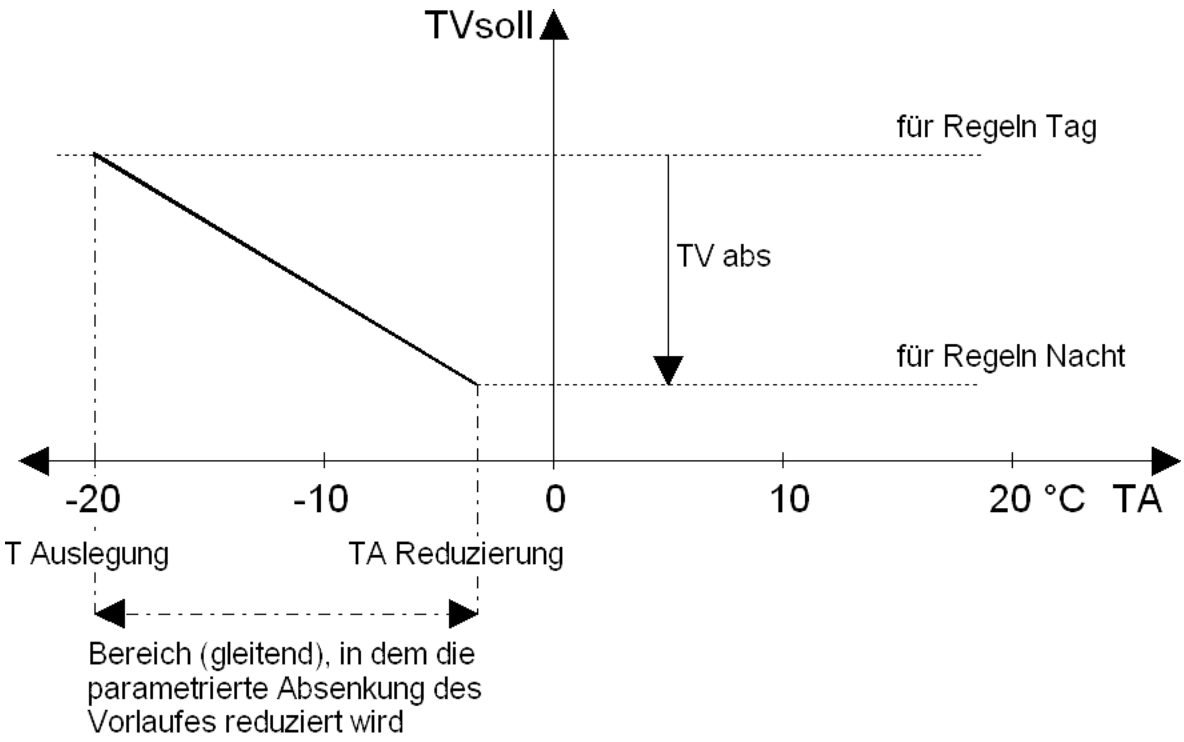
- the outside temperature from which the fall in supply temperature is no longer completely effective, parameter **5160 TO reduction**
- the design temperature for the heating plant, parameter **5172 T design**

If parameter **5160 TO Reduction** is deleted no automatic reduction occurs, i. e. the TS reduction **TS abs** remains fully operational.

There is no TS reduction if the outside temperature is close to the design temperature of the heating plant **5172 T design**. In this case the heating continues to to be controlled via the "day regulation".

If "TO **<= T design** + **TR target** - 18" then night rules -> day regulation

Example:



External set point for supply temperature

If an outside set point, parameter **5183 TStarget ext**, is set it replaces the target day value calculated in the basic heating program. The start reduction is still operational at night. Reducing the start reduction for particularly low outside temperatures remains effective.

There is no TS reduction if the outside temperature is close to the design temperature of the heating plant **5172 T design**. In this case the heating continues to be controlled via the "day regulation".
TOGrenzabs = **T design** + **TR target** - 18
If TO **<=** TOGrenzabs then night rules -> day regulation

Economy
The economy function is switched on with parameter **5170 Economy**. The economy status is displayed via **i019 Economy**.

If the calculated start set point falls so far that only low heating energy can be supplied to the room the recirculating pump is switched off and the Y-valve closed when the economy function is activated. The boiler is also switched off it is not switched on by another heating control circuit or boiler request (PLC). If a higher start set point is calculated, the boiler and recirculating pump come on again. The economy function differentiates between floor and radiator heating using the steepness of the heating curve EF.

<u>Conditions for switching the economy function on and off:</u>

Boiler Circulating pump	EF < 1.0 (under-floor heating)	EF > 1.0 (radiator heating)
Off	TStarget < TRtarget	TStarget < TRtarget + 5K
On	TStarget > TRtarget + 2K	TStarget > TRtarget + 7K

If the DDC software object S318 room correction or S300 optimize heating is installed and active the target room value TRtarget is set in this DDC sub-menu (TRtarget = MIN(**TR target; source room temperature**). Otherwise the economy function works with a fixed TRtarget = 20°C.

Frost protection

The frost protection function is switched on with parameter **5171 frost protection**.
It ensures that the recirculating pump does not switch off outside regular operation at an outside temperature < 3°C. This prevents the heating plant from freezing.
The recirculating pump is only switched off when the outside temperature exceeds 6°C.

Pump blocking protection

The "pump blocking protection" is now implemented by hardware objects.

Set point remote control, correction, switching

For active set point switching by software object S313 set point switching the set points are not switched for day regulation and night rules. Only the set point stipulated by the set point switching is operational.

The current set point is calculated with the following priority:

Priority	Function
Highest	**S313** Set point switch 1-4
	S316 Set point remote control
	S315 Set point correction
lowest	**S239** Basic program heating

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5000	**Zustand** State	actual value multistate	--	10	0	value,text 0,Off 1,Pre-lowering 2,Lowering 3,Interim heating 4,Heating-up 5,Previous 6,Regulations day 7,Regulations night 8,Economy 9,Standby

No.	name of parameter	parameter typ	min	max	init	unit
5102	**Q Reg** Source controlled variable	actual value deletable float	-infinity	+infinity	deleted	C
5103	**Q TA** Source TA	actual value deletable float	-infinity	+infinity	deleted	C
5105	**xw** XW	actual value float	-infinity	+infinity	0	K
5106	**tN** tN	set point deletable integer	1	99	3	min
5115	**Q_N** State N	actual value deletable text	--	--	deleted	--
5120	**XPY1** XPY1	set point float	0,5	999,9	50	K
5125	**D** Vorhalt	set point deletable integer	1	299	deleted	s
5128	**xwh** xwh	set point float	0	50	0	K
5141	**Y1min** Y1 min	set point float	0	100	0	%
5145	**Y1max** Y1 max	set point float	0	100	100	%
5151	**TVSakt** TVSoll current	actual value float	-infinity	+infinity	0	C
5152	**RegNach** Regulate with TA	set point boolean	--	--	0	--
5153	**TAvz** TAvz	set point float	-infinity	+infinity	0	C
5155	**EF** EF	set point float	0	10	1,5	--
5156	**KH** KH	set point integer	-100	100	0	K
5160	**TARed** TA Reduction	set point deletable integer	-50	30	deleted	C
5165	**TVmin** TV min	set point integer	0	999	20	C
5166	**TVmax** TV max	set point integer	0	999	95	C

No.	name of parameter	parameter typ	min	max	init	unit
5167	**TVabs** TV abs	set point integer	-999	0	-12	K
5168	**TAvz** Time constant TAvz	set point integer	1	99	24	h
5169	**TAm** TA middle	actual value float	-infinity	+infinity	0	C
5170	**Eco** Economy	set point boolean	--	--	0	--
5172	**Ausleg** T Configuration	set point integer	-50	0	-12	C
5173	**Y** YH1	actual value float	0	100	0	%
5175	**QFern** Source remote control	actual value multistate	--	4	0	value,text 9,Auto 1,Source remote day 35,Source remote night 0,Source remote OFF
5182	**Pu t** Pumps return flow	set point integer	0	30	20	min
5183	**TVSoll e** TV Set ext	actual value deletable float	-infinity	+infinity	deleted	C
7801	**h Y1** Manual influence Y1	set point deletable float	0	100	deleted	%
i004	**Tag** Regulate day	actual value boolean	--	--	0	--
i005	**Nacht** Regulate night	actual value boolean	--	--	0	--
i006	**Opt** Optimize	actual value boolean	--	--	0	--
i007	**Aufh** Heating	actual value boolean	--	--	0	--
i009	**Aus** Control condition AUS	actual value boolean	--	--	0	--
i010	**ZHeiz** Intermediate heating	actual value boolean	--	--	0	--
i019	**Eco** Economy	actual value boolean	--	--	0	--

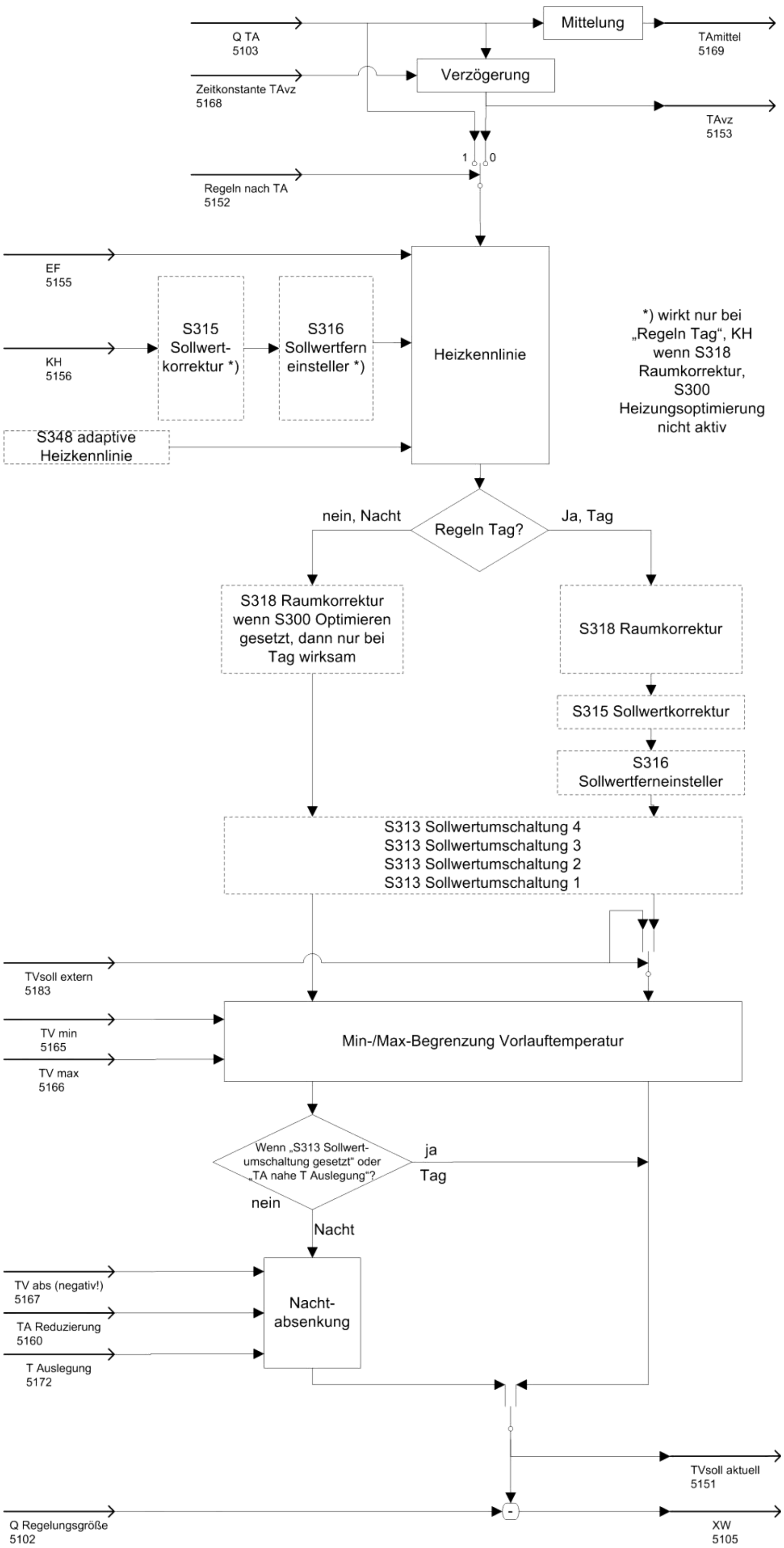
No.	name of parameter	parameter typ	min	max	init	unit
i020	**XP U** XP Changeover	actual value boolean	--	--	0	--
Z	**Z** Z-contacts	actual value multistate	--	5	4	value,text 1,Z1 Day 35,Z2 Night 36,Z3 Heating up 0,Z4 Off 9,Automatic

*	Nr.	Beschreibung
1)	H01	Bem: RPG-Index und "instanziiert-Bit" Red. 25.7.03 nach Fehlermeldung Sti.
2)	State	Gibt den Zustand des Heizautomaten wieder. 0 - Aus 1 - Vorabsenken 2 - Absenken 3 - Zwischenheizen 4 - Aufheizen 5 - Vorein 6 - Regeln Tag 7 - Regeln Nacht 8 - Economy 9 - Stand By

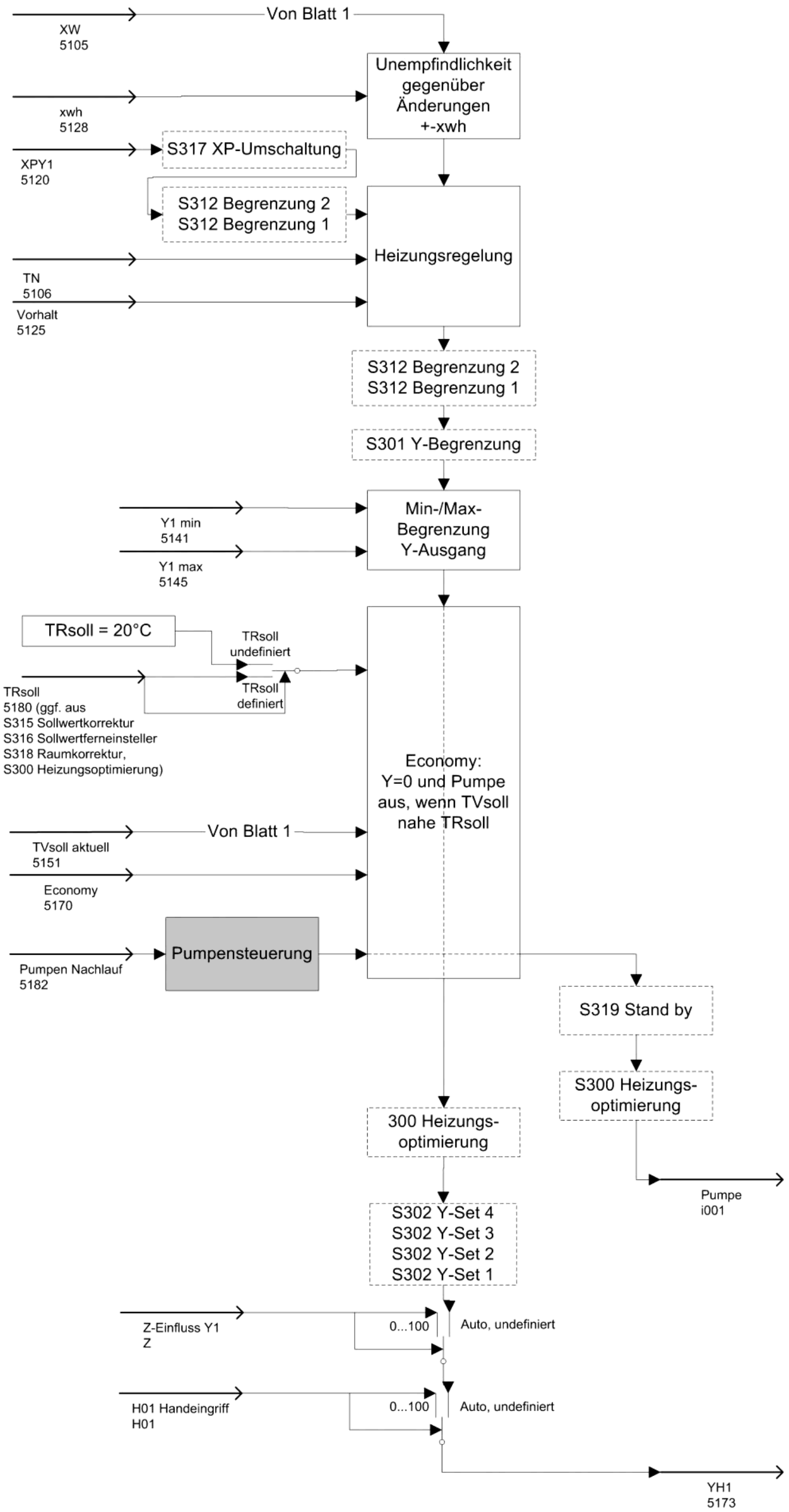
What is missing:
- better image file for heating curve, original is a Word graphic
- TO reduction, T design - image file, original is a Word graphic

4.3.2.10.1. Graphical summaries

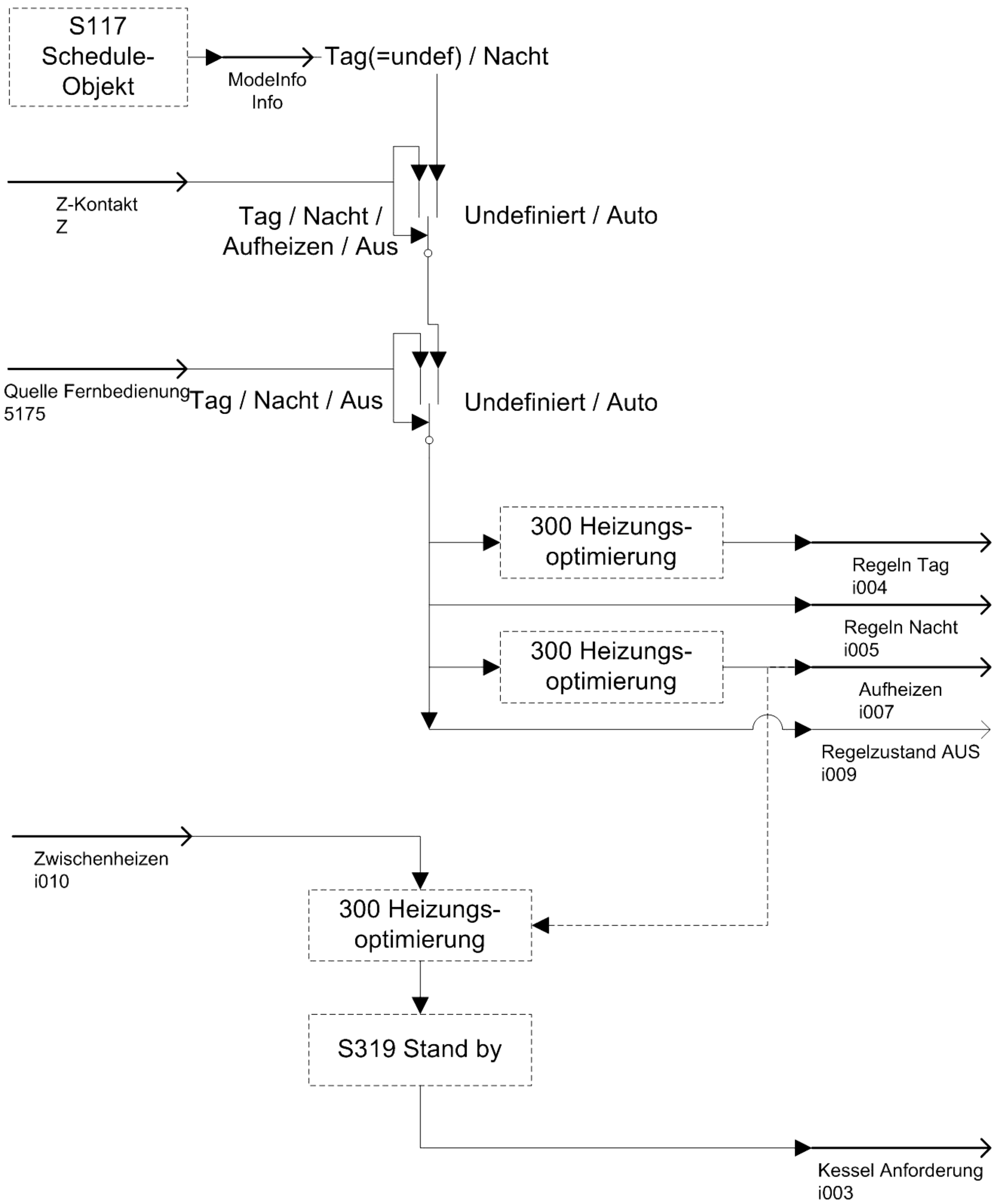
TStarget calculation



The controller



The statuses



4.3.2.10.2. S300 Optimization

Activation

Sub-function of	basic heating program	can be set once
Can be switched on-off via	**5380 Q EA Optimization**	if not defined, ON
Condition	A usage time program (schedule object S117) must be assigned to the basic program.	

Function summary

The DDC software object S300 Optimization (heating) has the function of controlling a heating plant such that at the start of the usage time the desired room temperature is reached and can fall directly at the end of the usage time.

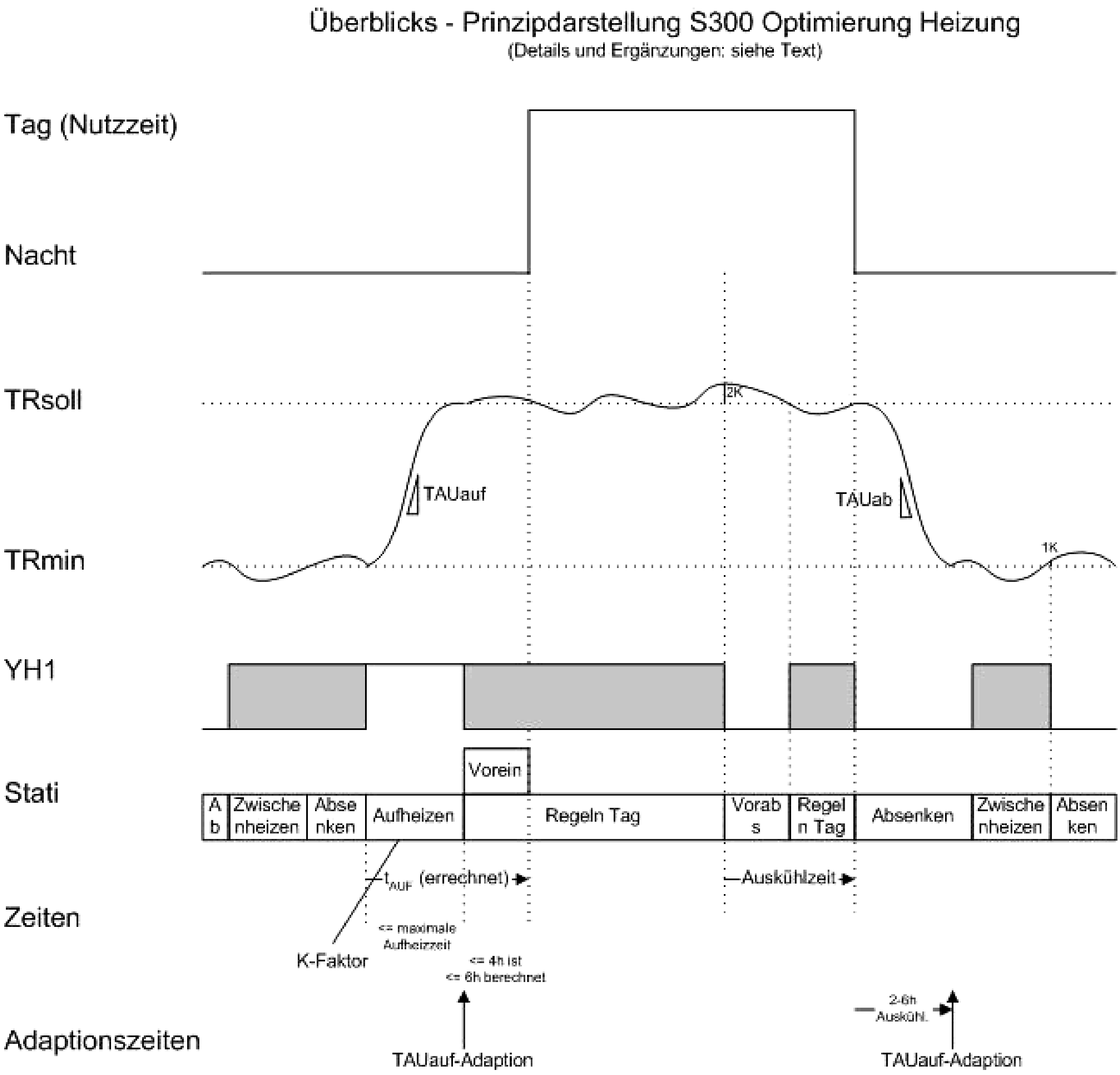
For this the parameters that represent the temperature behavior of the building are set, temperatures measured and calculations undertaken. These calculations include the responses of the previous control and management processes, i. e. it is adapted.

Times are calculated for switching the heating on in order to achieve the desired room temperature at the start of the usage time, or to lower the heating.

Function description

With the DDC software object the minimum heating time to achieve the target room value at the start of use is calculated. In the heating-up operation the building is heated with the maximum supply temperature. If the room temperature reaches the target room value of **5180 TRtarget** operation is switched from "warm up" to "day regulation". Using **5560 TAUup** the correct heating start time is calculated. The **5560 TAUup** and **5561 TAUdown** parameters are adapted as per the local environment.

The operation of the sub-menu can be switched ON or OFF via the binary source **5380 Q EA Optimization**.



Heating-up
If the heating circuit is in the "lowering" status the "heating" status is started when the calculated heating time tAuf>= the remaining time before usage starts.
The heating-up operation is ended

Advance switching on
If the rule is for target day value or usage time start, the heating operation and usage time start is < 4h and room temperature > RoomTargetDay or TO < TOGrenzabs

- if from 4 hr before usage starts TR >= **TRtarget** - 0.5K (transfer from "heating" to "preset"),
- if the continuing calculation of tAuf shows that the room temperature reached the set point by more than 6 hrs too soon (change from "heat up" to "lower"),
- if the usage time start TR >= **TRtarget** (transfer from "heating" to "day regulation"),
- if at usage time start TR < **TRtarget**, but the **maximum heating time** (Parameter 5150) is cancelled (transfer from "heating up" to "Day regulation").

Reduction operation
The relevant heating circuit moves to the "lower" status if

- end of usage is reached (Schedule output = night) or
- advance lowering is calculated (presets).

Advance lowering
In order to save energy the heating circuit can be changed to lowering operation if there is overheating as a result of third-party heating or the room's storage behavior even before the end of the usage time.
The calculation as to whether early switching off is possible is activated when: TR > **TRtarget** +2K.
Advance switching off takes place if the "Cooling time >= the remaining usage time". The cooling time is the period in which the room cools to the **TRtarget**temperature.
The heating switches on again (Day regulation) if TR < **TRtarget**.

The advance lowering can be permitted or prohibited using the **5565 Advlow** parameter.

Interim heating
Interim heating is used in lowering operation if the temperature falls below the lowering temperature **5181 TRmin**.
The intermediate heating status is quitted again,

- if TR >= **TRmin** + 1 K (transfer from "intermediate heating" after "falling"), if TR >= **TRmin** + 3 K,
- if the time to the next usage time is still more than 12 hours AND the difference **TRtarget** - **TRmin**is >= 6 K (transfer from "intermediate heating" and "lowering"),
- if TO <= **T design** + **TRtarget** - 18 K (transfer from "intermediate heating" to "Heating"),
- if the time span to the next usage time is lower than the calculated heating time (transfer from "intermediate heating" to "heating").

TAUup-Adaption
The parameter **5560 TAUup** describes the temperature increase (in K per hour) when heating the building. **TAUup** is a relatively long-term average value for the building physics facts (building constants) and is stated in the basic setting at 0.420 K/h.

The TAUup-Adaption occurs at the end of the heating period. (time of transfer from "heating" to "day regulation", "preset" or a return to "lowering" as a result of exceeding the **TRtarget)**.
Recalculating the TAUup only occurs if the actual heating time is larger than 40 and the temperature increase in the room is at least 0.5 K. 40 % of the newly calculated **TAUup** value flows into the calculation:

TAUup = 0.6 * TAUupOLD + 0.4 * TAUupNEW

Heating time = (**TRtarget** – Room temperature) / **TAUup** + **idle time**

TAUupNEW = (Room temperature heating - Room temperature heating start) / (heating end - heating start)

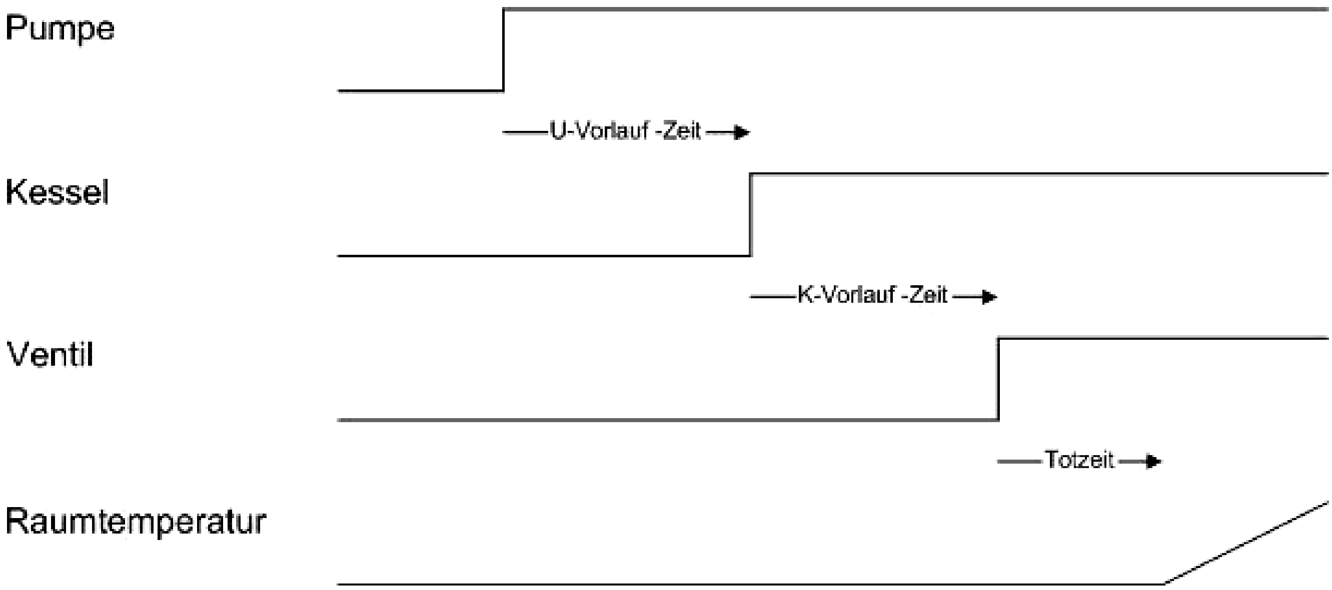
When starting up a different basic time setting can be set.
The TAUup-Adaption can be permitted or prohibited with the **5564 TAUup-Adapt** parameter

TAUdown-Adaption
The parameter **5561 TAUdown** describes the temperature decrease (in K per hour) when cooling the

building. TAUdown is a relatively long-term average value for the building physics facts (building constants) and is stated in the basic setting at 0.300 K/h.
The **TAUdown-Adaption** takes place within 6 hr from starting to lower the temperature, if in this time the building could cool down freely (i.e. no intermediate heating, manual intervention etc.). The calculation takes place if the room has cooled by 0.3 K within the period of 2 h to 6 hr after lowering starts. 40 % of the newly calculated **TAUdown** value flows into the calculation:

TAUdown = 0,6 * TAUdownOLD + 0,4 * TAUdownNEW

When starting up a different basic time setting can be set.
The TAUdown-Adaption can be permitted or prohibited with the **5563 TAUdown-Adapt** parameter

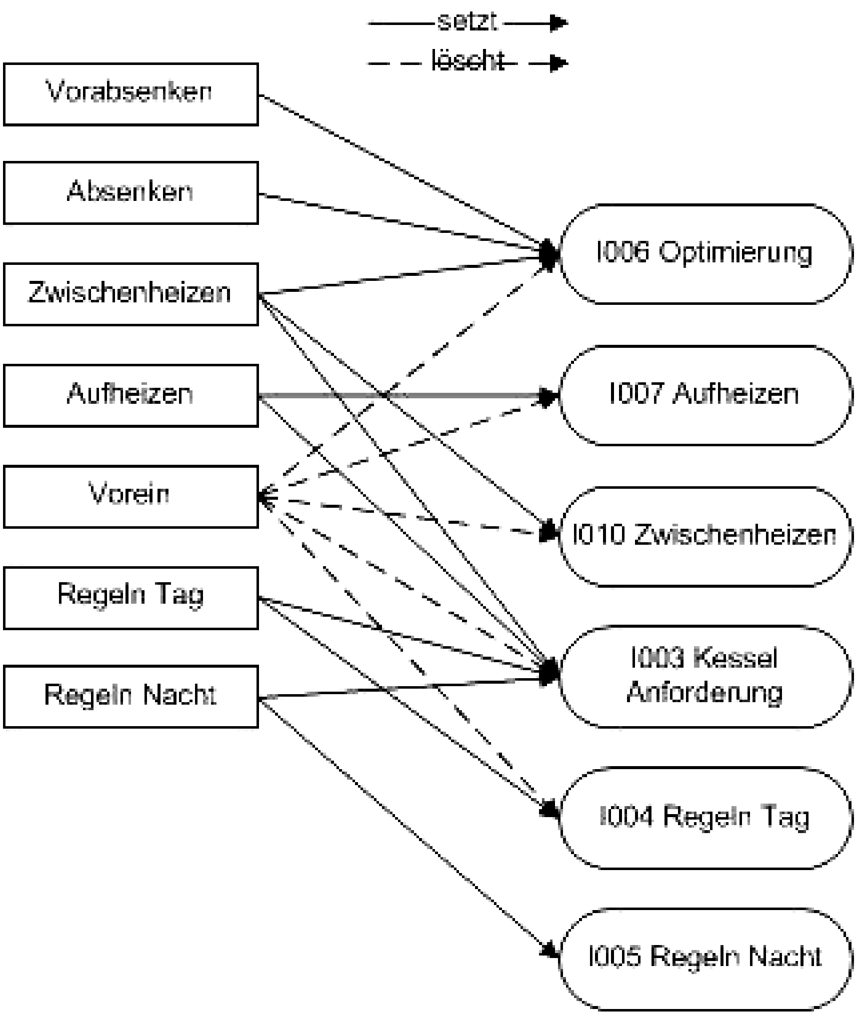


K Factor
The **5562 K factor** (no unit) parameter influences the heating phase. It considers the room temperature for the past three days. This provides a longer heating period. This may be necessary if there was no heating operation for a longer period of time due to holidays or a weekend.

U-starting, K-starting
The **5566 U-starting** (recirculating pump starting) and **5567 K-starting** (boiler starting) parameters are the time constants that characterize the plant technology. These can be set as per the specific plant technology.
At the time of changing from "lowering" to "intermediate heating" or "heating" the recirculating pump is first controlled via **I001**. After the end of the **U-starting** time the boiler request **I003** is active. Only after the end of the **K-starting** time is valve **5173 YH1** opened.

Idle time
The **5568 idle time** parameter is a time constant that characterizes the plant technology. These time constants are automatically re-calculated for an active **TAUup** Adaption by the circuit and represent the time that the controller requires after heating starts until the relevant change in room temperature occurs.
When starting up a different basic time setting can be set.

Outputs:



"Pre-lowering", "lower", "intermediate heating" and "heating" are used to set the internal output **I006 Optimization**.
If the heating circuit is in "heating" mode the internal **I007 heating** output is set.

For "intermediate heating" the internal output **I010 intermediate heating** is active.

In the "heating", "day regulation", "night rules" and "intermediate heating" modes the internal output **I003 boiler request** is set.

The "preset" status is a quasi-day rule mode - all I outputs are reset. Neither **I006 Optimization** nor **I004 day rules** is active. In "preset" **5151 TStarget**, **5105 XWcurrent** and **5173 YH1** regulate how the rules in "day rules" work.
In "pre-lowering" or "lower" the actuating signal **5173 YH1** is set to 0 %.

Special features
A forced, extraordinary heating process (chimney sweep) via the Z-influence (**Z03 Heating**) can falsify the **TAUup**-Adaption if this lasts longer than 40 minutes.
By deactivating the DDC sub-menu **Optimization** for a short time or changing the **5563 TAUup-Adapt = NO** parameter you can avoid adaption malfunctions.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5150	**Aufh max** Maximum heating-up time	set point deletable integer	0	300	deleted	min
5180	**TRsoll** TR set	set point float	-infinity	+infinity	20	C
5181	**TRmin** TR min	set point float	-infinity	+infinity	17	C
5380	**EA Opti** Q EA optimizing	actual value deletable boolean	--	--	deleted	--
5381	**Q Rt** Q room probe	actual value deletable float	-infinity	+infinity	deleted	C
5384	**EA** Q EA Room correction	actual value deletable boolean	--	--	deleted	--
5560	**t auf** Dew up HO	set point float	0	10	0,42	K/h
5561	**t ab** Dew down HO	set point float	0	10	0,3	K/h
5562	**K** K-Factor HO	set point float	0	1,5	0	--
5563	**tab erl** Dew up adapt HO	set point boolean	--	--	1	--
5564	**tauf erl** Dew down adapt HO	set point boolean	--	--	1	--
5565	**Vorabs** Initial HO	set point boolean	--	--	1	--
5566	**UVorl_HO** U-Feed HO	set point integer	0	60	0	min
5567	**KVorl_HO** K-Feed HO	set point integer	0	30	0	min
5568	**Totz HO** Dead time HO	set point integer	0	120	0	min
5316.4	**EF4** EF Y limitation	set point float	0	10	0	--
i001	**Pu** Pump	actual value boolean	--	--	0	--
i003	**Kessel** Boiler requirements	actual value boolean	--	--	0	--

what is missing: good process diagrams, times

4.3.2.10.3. S301 Y limitation

Activation

Sub-function of	each heating and ventilation basic program	0 ... can be set 4 x
Can be switched on-off via	5319 Q EA Y limitation	if not linked, ON

Function summary

The DDC software object S301 Y limitation influences the min or max limits of the Y outputs for the DDC control circuits (basic program).
A difference is to be made between two influence options that can jointly affect the basic function of the DDC control circuits:

1. Depending on a limitation factor the Y outputs Y-min or Y-max set in the basic program for the DDC control circuits are altered. The influence on the Y-min or Y-max occurs after the limitation factor reaches a particular limiting value.
   - For the MAX limit the limiting value must have exceeded the limiting value.
   - for the MIN limit the limitation factor must be below the limiting value so as to influence the setting range of the Y-outputs.
   - By inverting the Y-limit YES / NO the direction of influencing the Y-setting range is stipulated.
2. In addition to the functions stated in 1 the limiting value of the limitation factor can itself glide in a particular range. I.e. depending on the outside temperature (basic program) the limiting value of the limitation factor is also changed.

Function description

Re 1:

The limitation factor is set in parameter **5311 source Y-limitation**. Any DDC4000 system analog value can be set.

The Y-limitation influences the Y-output parameterized on parameter **5310 Y-limit. on**.

The DDC sub.menu **Y-limit** can be installed and set repeatedly for a DDC control circuit. If several **Y-limitation** DDC sub-menus work on the same Y output, the min and max limits calculated for each DDC software object are added.

For the basic PID program you have to choose between the 4 potential Y outputs.
For the basic heating program the Y limit always works on the heating control for a Y output.

Parameter **5312 YB-limiting value** sets the value from which the Y limit should act on the Y output setting range.

Parameter **5313 YB limitation** stipulates
whether a MAX limitation, i.e. exceeding the limiting value (image 3, image 4)
o r
a MIN limitation, i.e. going below the limiting value (image 1, image 2)

should affect the setting range of the Y output.

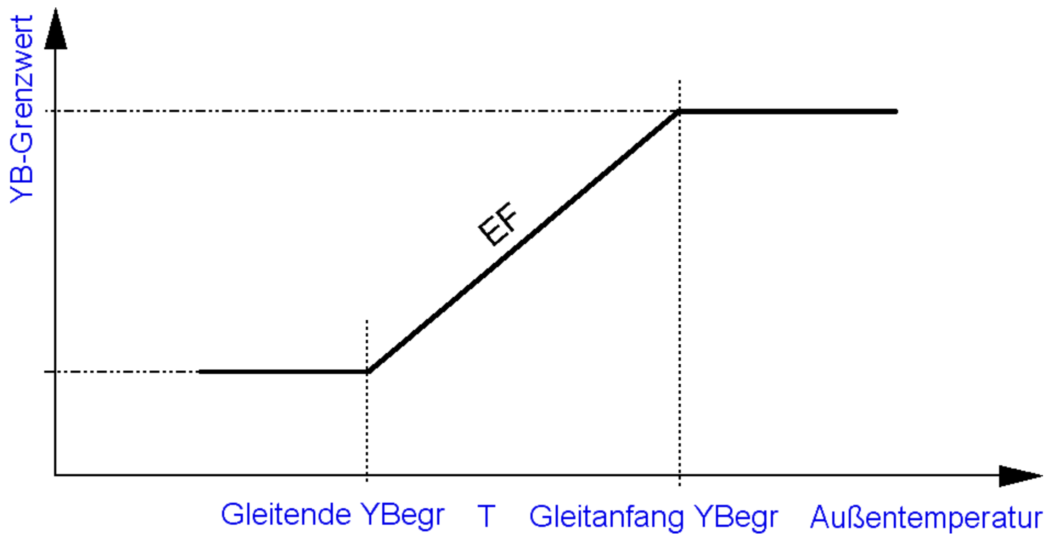
Parameter **5314 YB Inverting** stipulates the direction of the influence. (direction of curve)
5314 YB Inverting = NO -> (image 1, image 3),
5314 YB Inverting = YES -> (image 2, image 4),

Parameter **5315 XP Y-limitation** is the proportional range within which the Y-min or Y-max for the Y-outputs can be moved depending on the limitation factor.
5315 XP Y-limitation = 10 means: for 10 units change in the limitation factor Y-min or Y-max on the Y-output is moved by 100%.
5315 XP Y-limitation = 100 means: only for 100 units change in the limitation factor is Y-min or Y-max on the Y-output moved by 100%.

Re 2:

Depending on a command value (outside temperature, source parameter **5103 source TO** in the basic program of the DDC control circuit) the limitation value stipulated in parameter **5312 YB-limitation value** can glide.
The glide range is set in parameters **5317 glide start YLim** and **5318 glide end YLim**.

The influence of limiting value glide is set in parameter **5316 EF Ylimitation**.
5316 EF Ylimitation = 1 means: When changing the command value (outside temperature) by 1 K the limiting value stipulated in the **5312 YB-limiting value** parameter is moved by 1 unit.
5316 EF Ylimitation = 10 means: When changing the command value (outside temperature) by 1 K the limiting value stipulated in the **5312 YB-limiting value** parameter is moved by 10 units.



Priorities

The y-limitations 1-4 also work on the basic program's Ymin/Ymax.

Priority	Function
Highest	Y limitations of the basic program

Priority	Function
	5141 Y1min, 5145 Y1max
	...
	5144 Y4min, 5148 Y4max
lowest	DDC software sub-objects Y-limitation

Figure 1
Y limitation as
5313 YB-limitation = MIN
5314 YB Inverting = NO

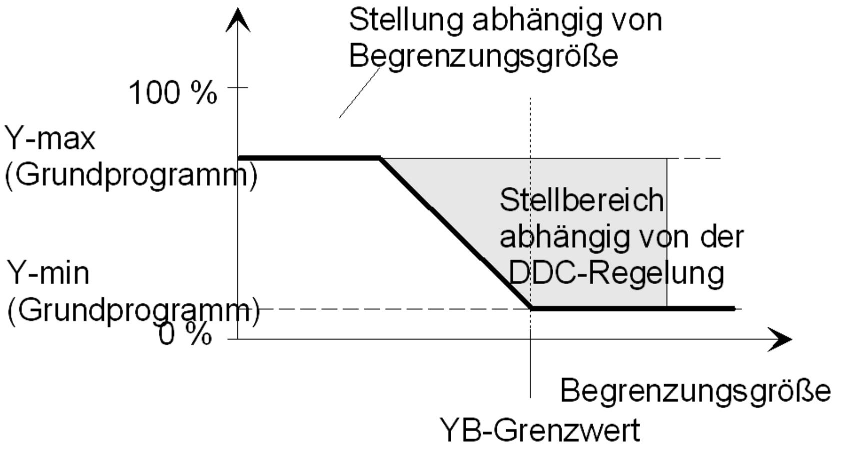


Figure 2
Y limitation as
5313 YB-limitation = MIN
5314 YB Inverting = YES

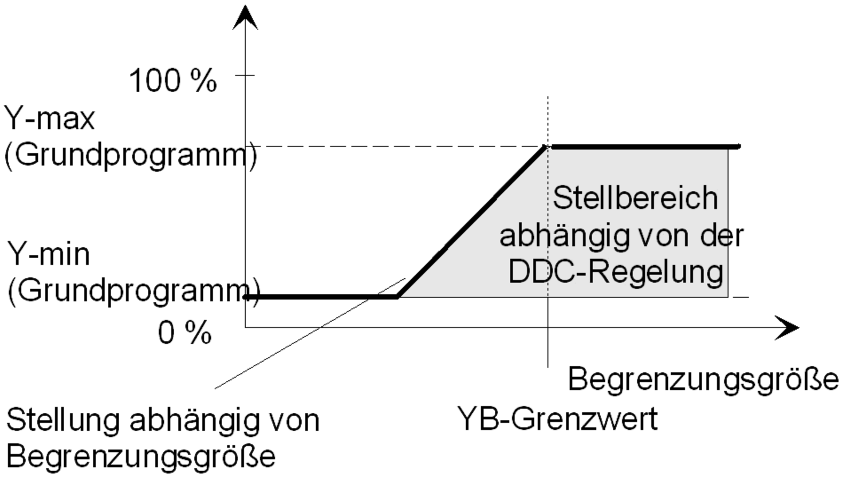


Figure 3
Y limitation as
5313 YB-limitation = MAX
5314 YB Inverting = NO

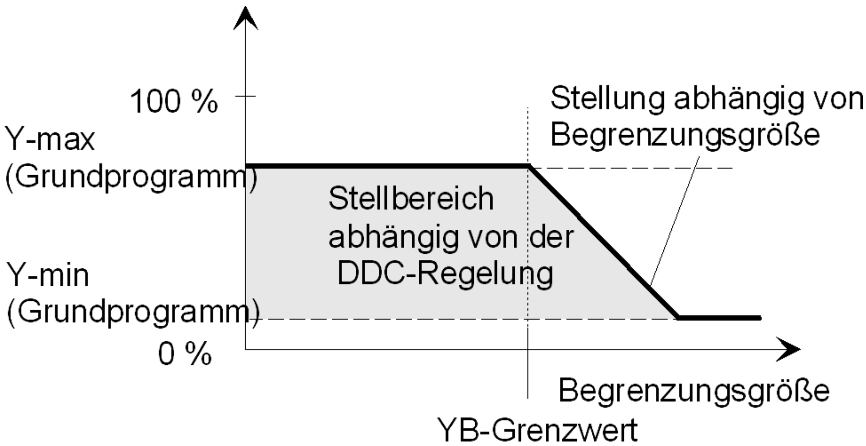
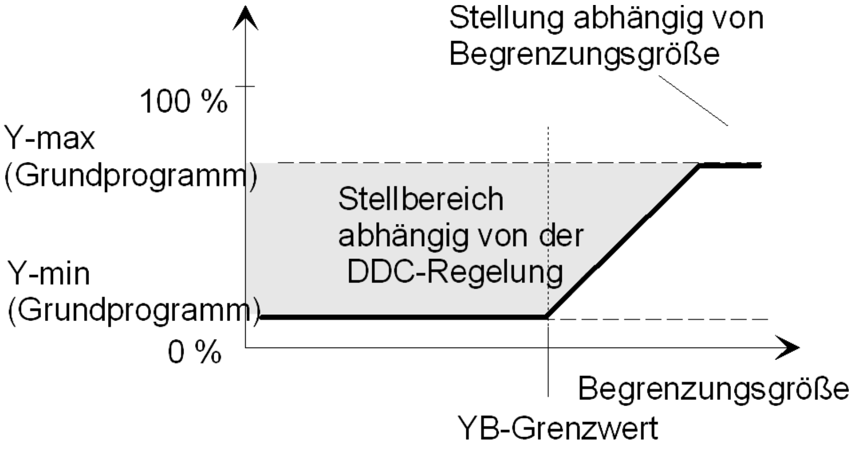


Figure 4
Y limitation as
5313 YB-limitation = MAX
5314 YB Inverting = YES



Parameters

Parameter 5313 Min/Max selection : "yes" = "1" means Max

No.	name of parameter	parameter typ	min	max	init	unit
5310.1	Y limit. affects	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5311.1	**Q1** Source Y-limitation	actual value deletable float	-infinity	+infinity	deleted	--
5312.1	**G1** YB-Limiting value	set point float	-infinity	+infinity	150	--
5312.2	**G2** YB-Limiting value	set point float	-infinity	+infinity	150	--
5313.1	**MMBegr1** YB-limitation	set point boolean	--	--	1	--
5314.1	**Inv1** YB Inversion	set point boolean	--	--	0	--
5315.1	**XP1** XP Y limitation	set point float	1	200	10	--
5316.1	**EF1** EF Y limitation	set point float	0	10	0	--
5317.1	**Anf1** Slide begin YBegr	set point float	-infinity	+infinity	22	C
5318.1	**End1** Slide end Y limit	set point float	-infinity	+infinity	32	C

No.	name of parameter	parameter typ	min	max	init	unit
5319.1	**EA1** Q EA Y-limitation	actual value deletable boolean	--	--	deleted	--
5320.1	**YBegr** Y-Limiting 1 active	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5310.2	Y limit. affects	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5311.2	**Q2** Source Y-limitation	actual value deletable float	-infinity	+infinity	deleted	--
5312.2	**G2** YB-Limiting value	set point float	-infinity	+infinity	150	--
5313.2	**MMBegr2** YB-limitation	set point boolean	--	--	1	--
5314.2	**Inv2** YB Inversion	set point boolean	--	--	0	--
5315.2	**XP2** XP Y limitation	set point float	1	200	10	--
5316.2	**EF2** EF Y limitation	set point float	0	10	0	--
5317.2	**Anf2** Slide begin YBegr	set point float	-infinity	+infinity	22	C
5318.2	**End2** Slide end Y limit	set point float	-infinity	+infinity	32	C
5319.2	**EA2** Q EA Y-limitation	actual value deletable boolean	--	--	deleted	--
5320.2	**YBegr** Y-Limiting 2 active	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5310.3	Y limit. affects	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4

No.	name of parameter	parameter typ	min	max	init	unit
5311.3	**Q3** Source Y-limitation	actual value deletable float	-infinity	+infinity	deleted	--
5312.3	**G3** YB-Limiting value	set point float	-infinity	+infinity	150	--
5313.3	**MMBegr3** YB-limitation	set point boolean	--	--	1	--
5314.3	**Inv3** YB Inversion	set point boolean	--	--	0	--
5315.3	**XP3** XP Y limitation	set point float	1	200	10	--
5316.3	**EF3** EF Y limitation	set point float	0	10	0	--
5317.3	**Anf3** Slide begin YBegr	set point float	-infinity	+infinity	22	C
5318.3	**End3** Slide end Y limit	set point float	-infinity	+infinity	32	C
5319.3	**EA3** Q EA Y-limitation	actual value deletable boolean	--	--	deleted	--
5320.3	**YBegr** Y-Limiting 3 active	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5310.4	Y limit. affects	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5311.4	**Q4** Source Y-limitation	actual value deletable float	-infinity	+infinity	deleted	--
5312.4	**G4** YB-Limiting value	set point float	-infinity	+infinity	150	--
5313.4	**MMBegr4** YB-limitation	set point boolean	--	--	1	--
5314.4	**Inv4** YB Inversion	set point boolean	--	--	0	--
5315.4	**XP4** XP Y limitation	set point float	1	200	10	--
5316.4	**EF4** EF Y limitation	set point float	0	10	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5317.4	**Anf4** Slide begin YBegr	set point float	-infinity	+infinity	22	C
5318.4	**End4** Slide end Y limit	set point float	-infinity	+infinity	32	C
5319.4	**EA4** Q EA Y-limitation	actual value deletable boolean	--	--	deleted	--
5320.4	**YBegr** Y-Limiting 4 active	actual value boolean	--	--	0	--

4.3.2.10.4. S302 Y set

Activation

Sub-function of	basic heating and ventilation program	0 ... can be set 4 x
Can be switched on-off via	5327 Q Y-SET	if not defined, ON

Function summary

With the Y-set DDC submenu the Y outputs of the DDC control circuits are stipulated by binary signals on certain (parameterizable) Y-values. If the binary signal = 1 the stipulated Y value works on the Y output.

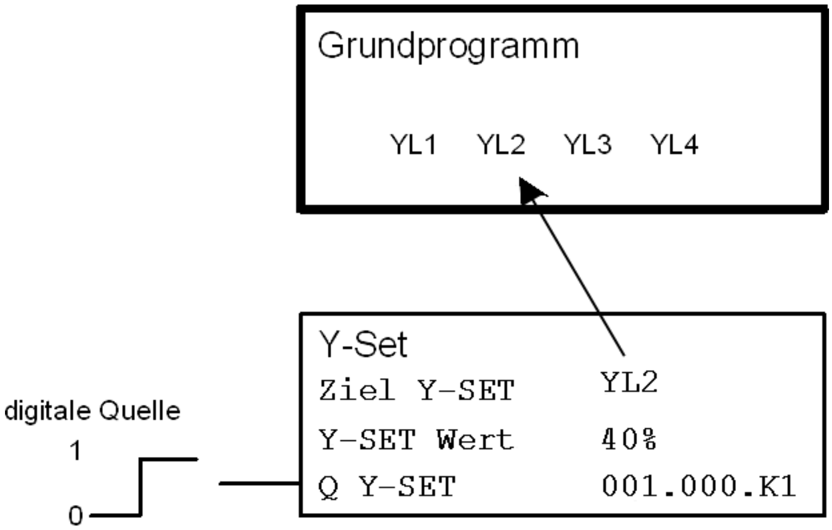
Function description

The Y-set DDC software object can be installed and set up to four times for one DDC control circuit. For this Y-set can work repeatedly on the same Y-output.

The address of the binary source is entered in parameter **5327 Q Y-SET**. If the binary source ="1", the analog value set in parameter **5326 Y-SET value** (0 ..100 %) is transferred to the Y-output. Parameter **5325 destination Y-SET** sets the Y output that is to be influenced.
For the basic PID program you have to choose between the 4 potential Y outputs. For the basic heating program the Y-set always works on the heating control for a Y output.

Priorities

Priority	Function
Highest	Manual intervention
	Central influence
	Y set (Index 01)
	Y set (Index 04)
	Limitation functions
lowest	Basic program control function



Parameters

Parameter 5325.x only applies if used in the GP PID!

No.	name of parameter	parameter typ	min	max	init	unit
5325.1	**Ziel1** Destination Y set	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5326.1	**Wert1** Y set value	set point float	0	100	0	%
5327.1	**Q1** Q Y fix	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5325.2	**Ziel2** Destination Y set	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5326.2	**Wert2** Y set value	set point float	0	100	0	%
5327.2	**Q2** Q Y fix	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5325.3	**Ziel3** Destination Y set	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5326.3	**Wert3** Y set value	set point float	0	100	0	%
5327.3	**Q3** Q Y fix	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5325.4	**Ziel4** Destination Y set	set point multistate	--	4	0	value,text 1,Y1 2,Y2 4,Y3 8,Y4
5326.4	**Wert4** Y set value	set point float	0	100	0	%
5327.4	**Q4** Q Y fix	actual value deletable boolean	--	--	deleted	--

4.3.2.10.5. S312 Limitation

Activation

Sub-function of	basic heating and ventilation program	0 ... can be set 2 x
Can be switched on-off via	5279 Q EA limitation	if not defined, ON

Function summary

The DDC control function of the main control circuit is restricted using DDC software object limitation. The limitation is required for example:

- for keeping the supply air temperature in ventilation controls in comfortable limits
- to curb the supply temperature in heating controls before reaching technological limiting values.

A max or min limit is possible in line with the requests.
The max or min limits may glide in line with a command value. E.g. if for ventilation controls, beside lifting the room´s set point depending on the outside temperature, concurrently min limit of the supply air is lifted.

Function description

In the DDC software object limitation the selected limitation sensor in the source parameter **5270 Q limitation sensor** is set. The limitation value is set with parameter **5271 limitation value**. Parameter **5272 limitation** sets whether this is a max or a min limiting value.

The limitation works in the following 2 phases:

a) The value of the limitation sensor nears the max or min limitation value.
b) The value of the limitation sensor is higher or lower than the max or min limitation value.

Re a) the limitation function is adopted gliding. The variance of the limitation sensor to the limitation value is compared with the main control variance of the basic program. Depending on the relevant control variance control is still made with the main control circuit XP.

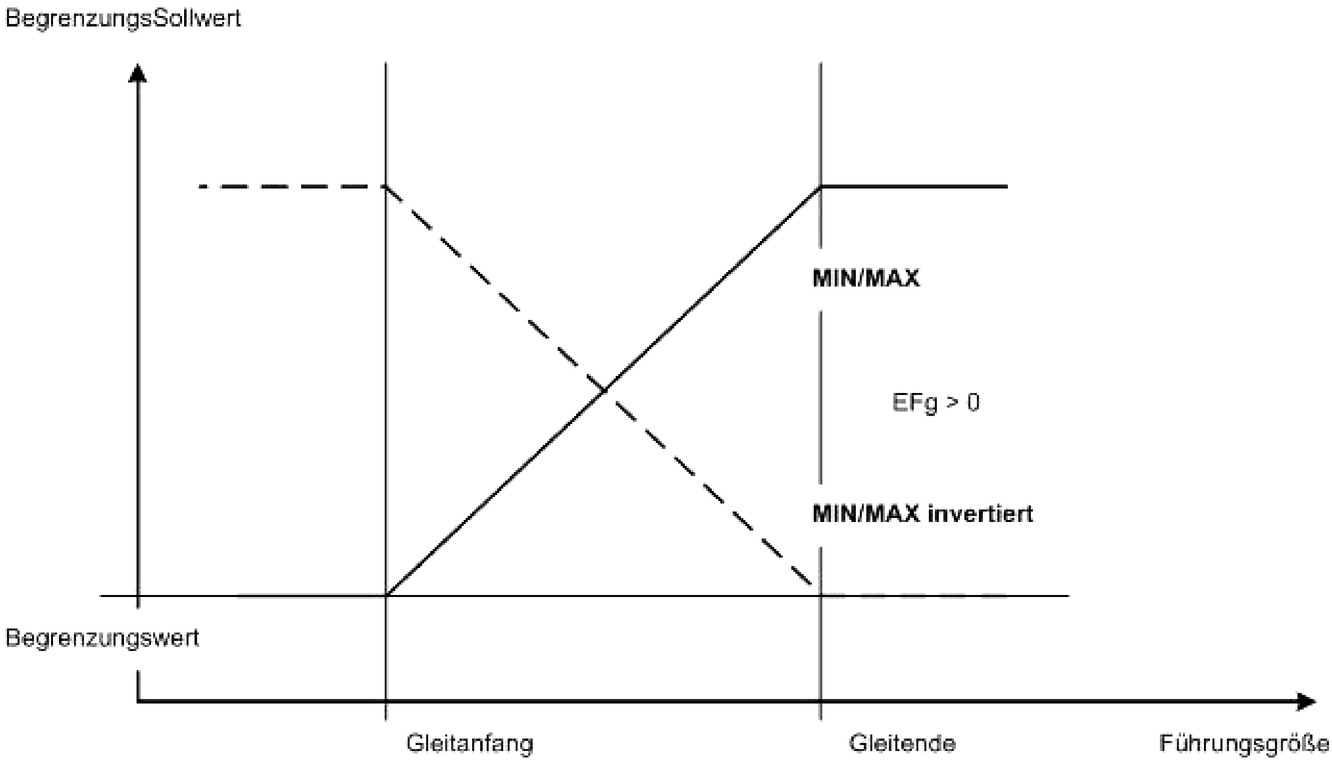
Re b) if the set Max limitation value is exceeded or the number falls below the min limitation value all XPs on the control circuit are replaced by **5273 XPlimitation** in order control the limitation value infringement as quickly as possible. This control status is indicated by switching the internal contact **V10 limitation** and **I020 XP switching** from "0" to "1".

Limiting value glide can occur for both the min. and max limiting values using command value source parameter **5275 command value limit**.

The range in which the min and max limits should glide is stipulated by parameters **5277 glide start limit** and **5278 glide end limit**. The influence of gliding is set by parameter **5276 EFg**. If **5276 EFg** = 0, glide does not occur.

If inverting is set winter compensation takes place, i.e. the limiting value is raised if the command

value falls below the value of **5278 glide end limit**.
If no inverting is set summer compensation takes place, i.e. the limiting value is raised if the command value exceeds the value of **5277 glide start limit**.
This means that inverting exchanges internally to calculating glide stat and end. (Please refer to the end of the document for all glide calculations.)



When inverting the min limit (**Inv limit**) the effect of the limitation function is inverted (works like a max limit).

When inverting the max limit (**Inv limit**) the effect of the limitation function is inverted (works like a min limit).

Limitation	Inverting	XW calculation
Minimum	No	MIN (XWgp; XWbegr)
Minimum	Yes	MAX (XWgp; -XWbegr)
Maximum	No	MAX (XWgp; XW begr)
Maximum	Yes	MIN (XWgp; -XWbegr)

Priorities

The limit with the object index 10 is prioritized higher than the one with object index 02.

The limitation function of the DDC sub-menu limit has a higher priority than that of the DDC sub-menu XP switching. But the following functions are differentiated: XP change and XW change.

Priorities of the limitation function a) (change to the current control variance):

Priority	Function
Highest	**S312.1** Limitation 1
	S303 Cascade (only PID)
lowest	**S312.2** Limitation 2

The current control variance is determined as follows:

1. XWcurrent = Limitation 2 (XWbasic program, XWlimitation2)
2. XWcurrent = cascade (XWcurrent, XWcascade) (only PID)
3. XWcurrent = Limitation 1 (XWcurrent, XWlimitation1)

Priorities of the limitation function b) (change to the XP range):

Priority	Function
Highest	**S312.1** Limitation 1
	S312.2 Limitation 2
lowest	**S317** XP conversion

Parameters

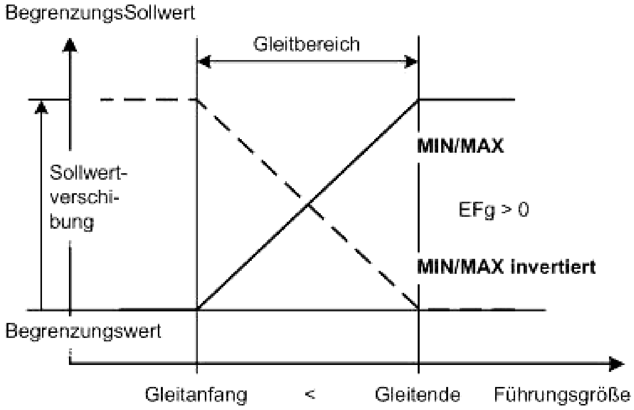
No.	name of parameter	parameter typ	min	max	init	unit
5270.1	**Q** Q limitation sensor	actual value deletable float	-infinity	+infinity	deleted	--
5271.1	Limitation value	set point float	-infinity	+infinity	150	--
5272.1	Limitation	set point multistate	--	2	1	value,text 0,Minimum 1,Maximum
5273.1	**XP1** XP limitation	set point float	0,5	200	10	--
5274.1	**inv** Inv. limitation	set point boolean	--	--	0	--
5275.1	**Q_Fg** Lead size limit	actual value deletable float	-infinity	+infinity	deleted	--
5276.1	**EFg** EFg	set point float	-10	10	0	--

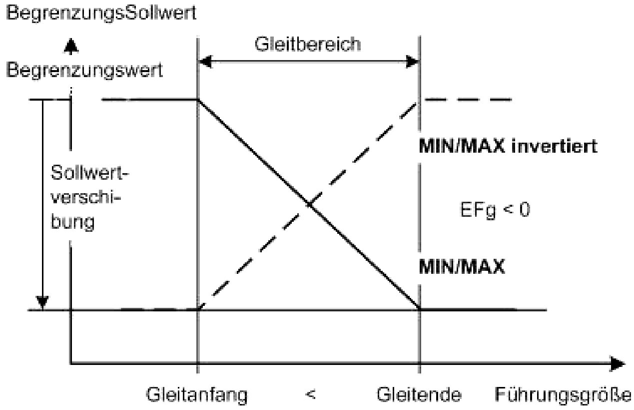
No.	name of parameter	parameter typ	min	max	init	unit
5277.1	**Anf** Slide begin limit	set point integer	-50	150	22	--
5278.1	**End** Slide end limit	set point integer	-50	150	32	--
5279.1	**EA** Q EA limitation	actual value deletable boolean	--	--	deleted	--
v10.1	Limitation	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5270.2	**Q** Q limitation sensor	actual value deletable float	-infinity	+infinity	deleted	--
5271.2	Limitation value	set point float	-infinity	+infinity	150	--
5272.2	Limitation	set point multistate	--	2	1	value,text 0,Minimum 1,Maximum
5273.2	**XP2** XP limitation	set point float	0,5	200	10	--
5274.2	**inv** Inv. limitation	set point boolean	--	--	0	--
5275.2	**Q_Fg** Lead size limit	actual value deletable float	-infinity	+infinity	deleted	--
5276.2	**EFg** EFg	set point float	-10	10	0	--
5277.2	**Anf** Slide begin limit	set point integer	-50	150	22	--
5278.2	**End** Slide end limit	set point integer	-50	150	32	--
5279.2	**EA** Q EA limitation	actual value deletable boolean	--	--	deleted	--
v10.2	Limitation	actual value boolean	--	--	0	--

Calculating the gliding of the target limitation value

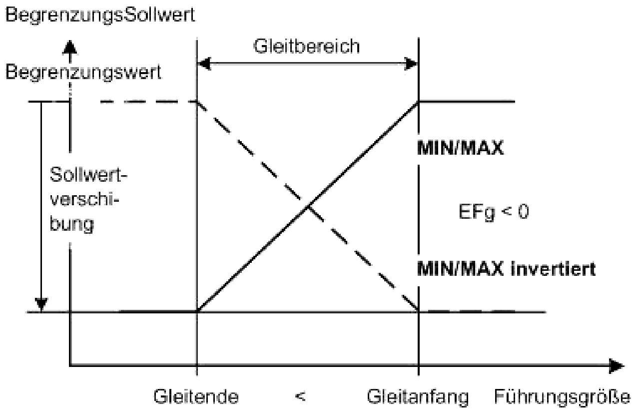
<u>glide start < glide end</u>

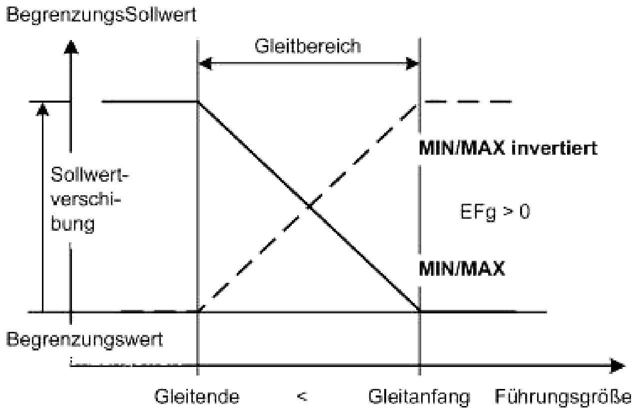




Invertierung ? JA		Invertierung ? NEIN	
FührGr < Gleitanfang	BegrSoll = BegrWert + (Gleitende - Gleitanfang) * EFg	FührGr < Gleitanfang	BegrSoll = BegrWert
Gleitanfang < Führgr < Gleitende	BegrSoll = BegrWert + (Gleitende - FührGr) * EFg	Gleitanfang < Führgr < Gleitende	BegrSoll = BegrWert + (FührGr - Gleitanfang * EFg
Gleitende < Führgr	BegrSoll = BegrWert	Gleitende < Führgr	BegrSoll = BegrWert + (Gleitende - Gleitanfang) * EFg
XW_{Begr} = BegrFühl - BegrSoll			

<u>glide end < glide start</u>





Invertierung ?

JA		NEIN	
FührGr < Gleitende	BegrSoll = BegrWert	FührGr < Gleitende	BegrSoll = BegrWert + (Gleitanfang - Gleitende) * EFg
Gleitende < Führgr < Gleitanfang	BegrSoll = BegrWert + (FührGr - Gleitende) * EFg	Gleitende < Führgr < Gleitanfang	BegrSoll = BegrWert + (Gleitanfang - FührGr) * EFg
Gleitanfang < Führgr	BegrSoll = BegrWert + (Gleitanfang - Gleitende) * EFg	Gleitanfang < Führgr	BegrSoll = BegrWert

XW_{Begr} = BegrFühl - BegrSoll

4.3.2.10.6. S313 SP switching

Activation

Sub-function of	basic heating program and PID	0 ... 4 can be set
Can be switched on-off via	**5288 Q EA Special target**	if not defined, ON

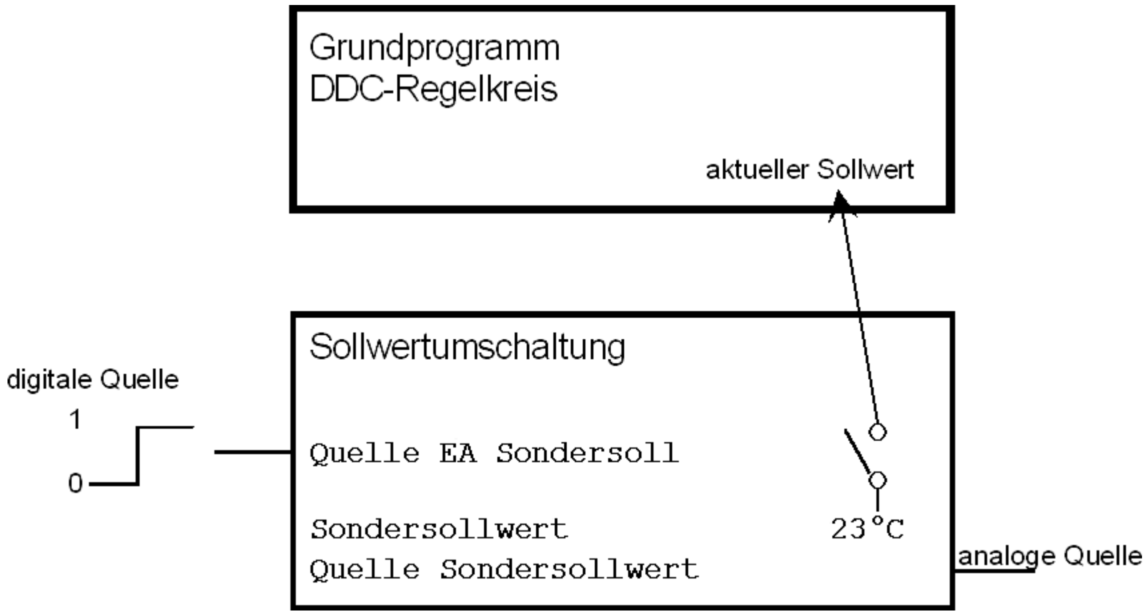
Function summary

In the DDC software object S313 set point switching a constant is defined that replaces the set point of the DDC control circuit depending on a binary source. In addition any analog value can be assigned as a set point via an analog source.

Function description

In the DDC software object set point switching an analog value is set from a source, parameter **5285 Q Special set point** (e.g. a characteristic value) or a constant, parameter **5286 Special set point**. The value of the analog source has a higher priority than the constant.

Depending on a binary source, parameter **5287 Q EA special set point** replaces the value of the analog source or the constants the set point of the DDC control circuit.



It is possible to delay switching between the values. Parameter **5287 slope special set point** is used for this. The number of K/min by which the set point may change at most can be entered here.

Switching to the special set point can be switched ON or OFF via the binary source (**5288 Q O special target**). If parameter **5287 slope special set point** has a valid value entered, changes to the set point in the basic program (e.g. day/night set point in basic heating program) is always

accompanies by a time delay for an active "Menu SPSW". The slope with the highest priority is operational (object index 1 before 2 before 3 before 4).

Priorities

Object index 1 has the highest priority, menu index 4 has the lowest priority.

1. Set point switching 1 15313.1
2. Set point switching 2 15313.2
3. Set point switching 3 15313.3
4. Set point switching 4 15313.4
5. Set point remote control 15316
6. Set point correction 15315

Note

Basic heating program:
In the basic heating program the set point switching replaces the calculate **TStarget current** from the basic program or the target room value **TR target** for the set DDC sub-menu 15318 room correction and/or 15300 optimize. Switching to a firm **TS target/TR target** excludes night falls. If the optimize sub-menu is active the new **TR target** influences intermediate heating, pre-lowering, preset, the heating up time and the adaptions.

Basic PID program:
In the PID basic program for active set point switching the current set point XS current is overwritten. If in addition to the basic program the DDC software object S314 set point glide also works this calculated XS current is overwritten.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5285.1	**Q-XS** Q Sondersollwert	actual value deletable float	-50	150	deleted	C
5286.1	**XS** custom setpoint	set point float	-50	150	0	C
5287.1	**K/min** Q EA custom setpoint	set point deletable float	0,1	60	deleted	K/min
5288.1	**EA** Q EA custom setpoint	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5285.2	**Q-XS** Q Sondersollwert	actual value deletable float	-50	150	deleted	C

No.	name of parameter	parameter typ	min	max	init	unit
5286.2	**XS** custom setpoint	set point float	-50	150	0	C
5287.2	**K/min** Q EA custom setpoint	set point deletable float	0,1	60	deleted	K/min
5288.2	**EA** Q EA custom setpoint	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5285.3	**Q-XS** Q Sondersollwert	actual value deletable float	-50	150	deleted	C
5286.3	**XS** custom setpoint	set point float	-50	150	0	C
5287.3	**K/min** Q EA custom setpoint	set point deletable float	0,1	60	deleted	K/min
5288.3	**EA** Q EA custom setpoint	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5285.4	**Q-XS** Q Sondersollwert	actual value deletable float	-50	150	deleted	C
5286.4	**XS** custom setpoint	set point float	-50	150	0	C
5287.4	**K/min** Q EA custom setpoint	set point deletable float	0,1	60	deleted	K/min
5288.4	**EA** Q EA custom setpoint	actual value deletable boolean	--	--	deleted	--

4.3.2.10.7. S315 Set point correction

Activation

Sub-function of	basic heating program and PID	0 ... can be set once
Can be switched on-off via	**5292 Q EA Target correction**	if not defined, ON

Function summary

DDC software object S315 address an analog source to which the set point correction control is connected or from which any analog value can be read. This analog value works as a correction on the DDC control circuit set point.

Function description

Parameter **source target correction 0..100 %** sets the analog value of a set point correction control or any analog value of the DDC4000 system. The value range produced by this analog source is interpreted as 0 ... 100%. (Effect like **source target correction** in the DDC3000)

The value range for the set point correction is set with parameters **upper limit release SPC** and **lower limit release SPC**. The measuring unit of this range is matched automatically to the measuring unit of the set point being corrected.

SPC = (release SPC UL - release SPC LL) / 100 * Q SPC (in 0..100 %) + release SPC LL

Parameter **source target correction absolute value** sets the analog value of a set point correction control or any analog value of the DDC4000 system. The value range produced from this analog source is processed as a real value, e.g. -5..5 K.

The imported value is kept in the **upper limit release SPC** and **lower limit release SPC** limits. Higher/lower values are cut off. The source **target correction absolute value** has a higher priority than **source target correction 0..100 %.**

The function of the DDC sub-menu can be switched ON (Status = 1) or OFF (Status = 0) with a binary source. (**Q EA Target correction**)
If no binary source is set the function is switched to ON.

Priorities

If in addition to the DDC software object set point correction a DDC software object set point switching and/or set point remote control is active, the following priorities apply:

Priority	Function
Highest	Set point switch 1 **S313.1**
	Set point switch 2 **S313.2**

Priority	Function
	Set point switch 3 **S313.3**
	Set point switch 4 **S313.4**
	Set point remote control **S316**
lowest	Set point correction **S315**

Example

DDC control circuit set point to be corrected	Lower limit SPC release	Upper limit SPC release	valid range for a set point correction
20°C	-4	6	16 °C to 26 °C
5mBar	0	2	5 mBar to 7 mBar

Note

Basic heating program:
The DDC submenu set point correction only works for "day regulation".
The set point correction influences KH (parallel movement of heating curve) if the DDC sub-menu 15318 room correction or 15300 optimization is not active.

TStarget new = TStarget + target correction

If DDC room correction or optimize sub-menus are active the room set point **TRtarget** is changed by the set point correction. This, for example, influences the economy function and the start set point for active room correction.

TRtarget new = TRtarget + target correction

Room correction: TStarget new = TStarget -(Roomtemp – TRtarget new) * ER correction

Optimization: NO TStarget correction

Basic PID program:
In this basic program the set point correction works on the current set point **XS current**.
XS current new = XS current + target correction

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5290	**Q100** Q EA Setpoint Correction	actual value deletable float	0	100	deleted	%

No.	name of parameter	parameter typ	min	max	init	unit
5291	**Q** Source Setpoint Correction	actual value deletable float	-infinity	+infinity	deleted	--
5292	**EA** Q EA Setpoint Correction	actual value deletable boolean	--	--	deleted	--
5293	release SWK	set point float	-infinity	+infinity	-5	K
5294	Release SWK above	set point float	-infinity	+infinity	5	--

4.3.2.10.8. S316 Set point remote control

Activation

Sub-function of	Heating and ventilation basic program	0 ... can be set once
Can be switched on-off via	5238 Q EA Energy choice	if not defined, ON

Function summary

DDC software object set point remote control addresses an analog source to which the set point correction control is connected or from which any analog value can be read.

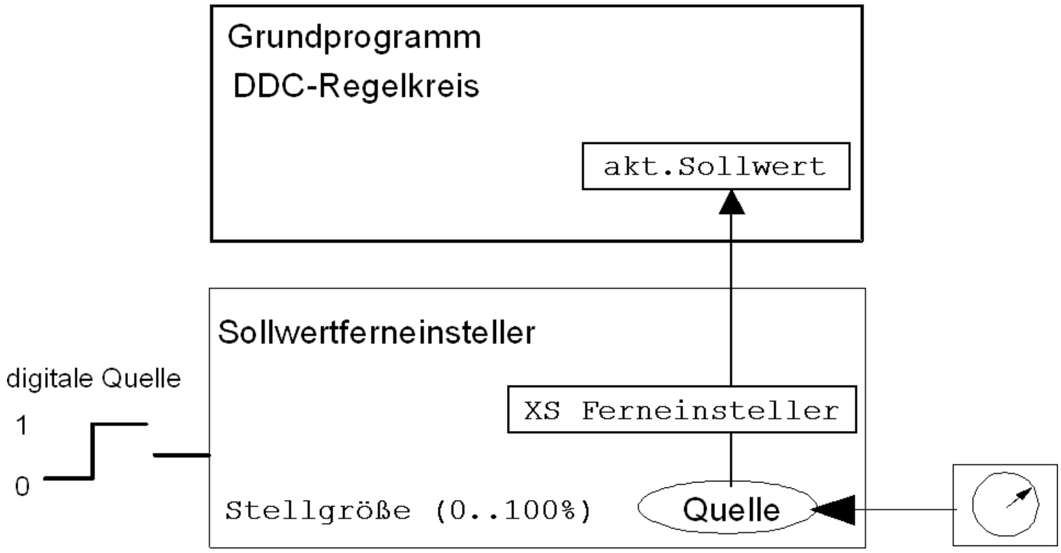
Function description

Parameter **5260 actuating variable** sets the value of a set point control or any analog value of the DDC4000 system whose value range was previously scaled to 0 .. 100%.

The value range for the set point remote setting is set with parameter **5261 Start remote** and parameter **5262 End remote**. The measuring unit of this range is matched automatically to the measuring unit of the set point being set.

The calculated set point is depicted on parameter **5265 XS remote control**. This analog value replaces the set point of the DDC control circuit.

The function of the sub-menu can be switched ON (Status = 1) or OFF (Status = 0) with a binary source.
(Status = 0). (**Q EA TargetRemote)**
If no binary source is set the function is switched to ON.



Priorities

If in addition to the DDC software object set point remote control a DDC software object set point switching and/or set point correction is active, the following priorities apply:

Priority	Function
Highest	**S313.1** Set point switch 1
	S313.2 Set point switch 2
	S313.3 Set point switch 3
	S313.4 Set point switch 4
	S316 Set point remote control
lowest	**S315** Set point correction

Example:

5261 Start remote	5262 End remote		5265 XS remote control at 0 ..100% value change
10 °C	25 °C		10 °C .. 25 °C
20 %rF	80 %rF		20 %rF .. 80 %rF
0 mBar	5 mBar		0 mBar .. 5 mBar

Note

Basic heating program:
The DDC submenu set point correction only works for "day regulation".

The set point correction influences KH (parallel movement of heating curve) if the DDC software object S318 room correction or S300 optimization is not active.

TStarget correction = XS remote control = (End remote - start remote) * actuating variable / 100 % + start remote

TStargetnew = TStarget + TStarget correction

If the DDC software object room correction or optimize are active the room set point **TRtarget** is changed by the **XS remote control**. This, for example, influences the economy function and the start set point for active room correction.

Room correction: TStargetcorrection = (Room temp - XS remote control) * ER

Optimization: NO TStarget correction

Basic PID program:
In this basic program the set point remote control works on the current set point **XS current**.

XS current = XS remote control = (End remote - start remote) * actuating variable / 100 % + start remote

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5260	Set size	actual value deletable float	0	100	deleted	--
5261	**Anf** Begin remote	set point integer	-2147483648	2147483647	0	--
5262	**End** End remote	set point integer	-2147483648	2147483647	50	--
5263	**EA** Q EA setpoint remote	actual value deletable boolean	--	--	deleted	--
5265	XS Remote setting	actual value float	-infinity	+infinity	0	--

4.3.2.10.9. S317 XP switching

Activation

Sub-function of	basic heating program and PID	0 ... can be set once
Can be switched on-off via	5306 Q XP switching	if not defined, ON

Function summary

DDC control circuit control setting parameters are switched with the DDC sub-menu XP switching. Depending on a binary source the proportional ranges of the Y outputs, the rate and regulating periods can be switched.

Function description

The binary source is set in parameter **source XP switching**.
If the digital source **Q XP switching** is "1" or "---" the controller setting parameters are replaced by the set setting values.
The working XP switching is displayed via internal contact **I20 XP switching** in the basic heating program or PID.

Note:
In the basic heating program **I20 XP switching** only becomes "1" if XPY1 changes. Only changes **TN New** and/or **rate New**; **I20 XP switch** remains "0". **I20 XP switch** can also be "1" as a result of a limit.

Priorities

The DDC sub-menus limitation menus 1 and 2 work before the XP switch.

Priority	Function
Highest	Limitation 1 **S312.1**
	Cascade (only PID) **S303**
	Limitation 2 **S312.2**
	XP switching **S317**
lowest	Structure delay start-up **S304**

Special Functions

Depending on the reset time **tN** set in the basic program the
XPY (basic program) is switched to the XPY (XP switching) gliding and vice versa.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5300	**XPY1** XPY1 New	set point float	0,5	999,9	50	K
5301	**XPY2** XPY2 New	set point float	0,5	999,9	50	K
5302	**XPY3** XPY3 New	set point float	0,5	999,9	50	K
5303	**XPY4** XPY4 New	set point float	0,5	999,9	50	K
5304	**tN** Tn New	set point deletable float	0,5	99	3	min
5305	**d** Vorhalt	set point deletable integer	1	99	deleted	s
5306	**Q** Q XP change overR	actual value deletable boolean	--	--	deleted	--
i020	XP Changeover	actual value boolean	--	--	0	--

4.3.2.10.10. S318 Room correction

Activation

Sub-function of	basic heating program	can be set once
Can be switched on-off via	5384 Q EA Room correction	if not defined, ON

Function summary

The basic heating program controls the supply temperature due to the weather. The set point of the supply temperature is calculated as per the heating curve, which in turn is stipulated by the KH (parallel movement) and EF (steepness) parameters.
The calculated start set point is corrected with the DC software object room correction if the temperature in the reference room varies from the target room temperature value set.
The correction occurs by the parallel movement of the heating curve.

Function description

The determined target supply temperature (**5151 TStarget current**) is corrected by the room correction DDC software object when the room temperature source parameter **5381 Q room sensor RK** varies from the target room temperature value set in the **5180 TRtarget** (day operation) or **5181 TRmin** (night operation) parameters.

The **5382 ER correction** parameter determines the influence of the normal variance from the target room value to the correction of the target starting temperature value.

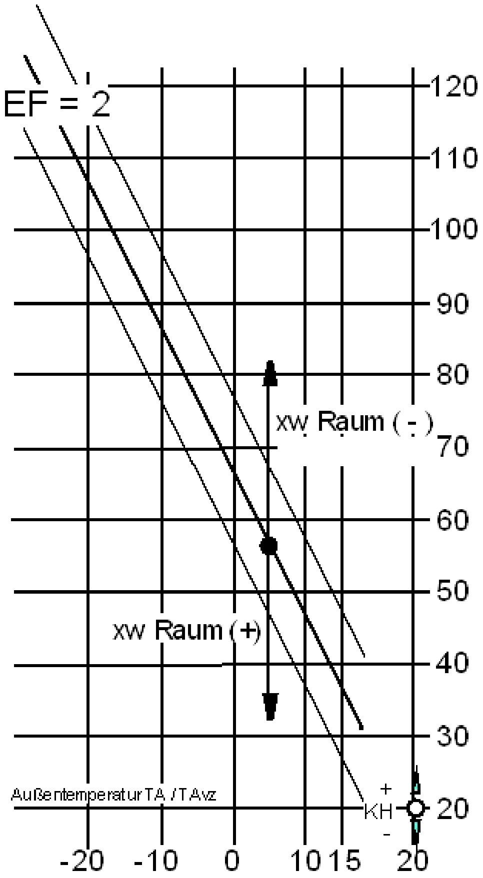
Correction target starting value = XW Room * ER Corr

Day: TStarget current = TStarget heating curve - (room temp. - TR target) * ER
Night: TStarget current = TStarget heating line + TS abs - (room temp. - TR min) * ER

Example:
Heating curve with EF = 2.
If the room temperature is too low the KH is raised. Therefore the target supply temperature is raised.
If the room temperature is too high the KH is lowered. Therefore the target supply temperature is lowered.

If the room temperature falls faster than 2K/h, after the passing of a delay period **5383 delay RK** the target supply temperature is corrected. This suppresses short-term set point corrections, e.g. if a window was opened for a short period of time. If this delay is not wanted the **5383 delay RK** entry should be deleted with [CE] (basic).

The function of the DDC software object can be switched ON (Status = 1) or OFF (Status = 0) with a binary source. (**Q EA room correction)**
If no binary source is set the function is switched to ON.



Priorities

If the DDC software object S300 Optimize is set at the same time the DDC software object 318 room correction is only effective in "Day regulation".
If the software object 316 set point remote control is active the 5180 TR parameter in the "Day regulation" is replaced by 5265 XS remote control.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5180	**TRsoll** TR set	set point float	-infinity	+infinity	20	C
5181	**TRmin** TR min	set point float	-infinity	+infinity	17	C
5381	**Q Rt** Q room probe	actual value deletable float	-infinity	+infinity	deleted	C
5382	**ER** ER correction	set point float	0	10	3	--
5383	**Verz** Delay RK	set point deletable float	10	60	deleted	min

No.	name of parameter	parameter typ	min	max	init	unit
5384	**EA** Q EA Room correction	actual value deletable boolean	--	--	deleted	--

Par.No	Parameter name, plain text	Description	Input	Ed.	lower limit	upper limit	specification	Unit
	Activation parameter							
5384	Q EA room correction	Activate, deactivate function	x		0	1	---	
	Parameters							
5381	Q room sensor	measured room temperature	x		-?	?	---	°C
5382	ER correction	Influence on TStarget	x		0.0	10.0	3.0	
5383	Delay RK	Delay time for room correction	x		10	60	---	min
5180	TR target	Target room temperature day operation	x		-?	?	20.0	°C
5181	TR min	Target room temperature night operation	x		-?	?	17.0	°C
	Parameter from the basic program (described there)							
5151	TStarget current	calculate supply temperature		x				

4.3.2.10.11. S319 Standby

Activation

Sub-function of	basic heating program	0 ... can be set once
Can be switched on-off via	**5397 Q EA Standby**	if not defined, ON

Function summary

The stand-by DDC software object has the function of switching off the DDC control if a certain outside temperature is exceeded. The DDC control is only re-started if the outside temperature is lower than a stipulated value. It is switched on and off depending on the selected standby type (see below).

Function description

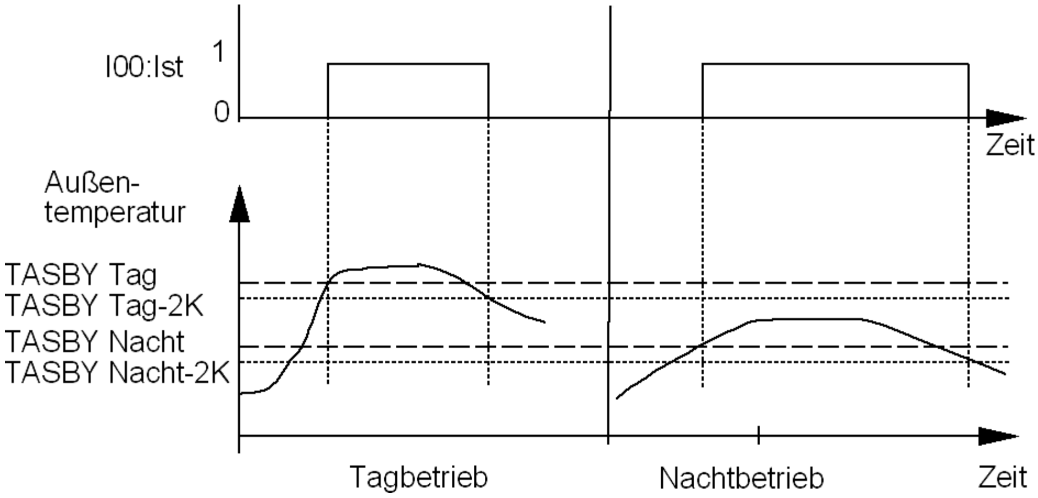
For the standby function the outside temperature (**Source TO**) of the basic heating program applies when no source is entered in the **5392 Q StandBy** parameter. It is possible to parameterize another source, e. g. an average outside temperature. This source is then prioritized higher than the basic program (**Source TO**).

If **5391 Standby type "ZQD"** is selected, the stand by function depends on the average temperature, which is either formed by the outside temperature**Source TO** or from **Q StandBy**. In **Standby type "MRP"** the absolute temperatures are used as the criterion.

For **standby type = MRP** the following applies:

If the outside temperature exceeds the limiting values stated in the **TASBY day** or **TASBY night** parameters the following switching functions are executed 1 hour after exceeding the limitation values:

- the internal contact **I003 boiler request** of the basic heating program switches off, **I003 = 0**
  with a hunting time stipulated in the basic heating program **pump hunting** the internal contact **I001 Pump ON** switches off, **I001 = 0**
  the internal contact **I008 Stand By** switches on, **I008 = 1**



If **TASBY day / TASBY** night is exceeded as a result of a change in usage time the switch to the stand by status takes place immediately.

The standby status is quitted again without time delay if the outside temperature falls with a switch back difference **XSD StandBy** under **TASBY day / TASBY night**. A 1 hour time delay switch back takes place. If the switch back condition is met as a result of the change in usage time, the switch back takes place immediately.

For **standby type = ZQD** the following applies:
If the average outside temperature exceeds the limiting value set in the **TASBY day** parameter for 3 days, standby is switched on the third day. The switch back to normal operation occurs with a time delay of 1-3 days depending on the setting in **5396 switch back (ZQD)**. The internal average outside temperature must be lower than **TASBY DAY** by the switch back difference **XSD StandBy**. Usage time changes are not considered.

The function of the DDC software object can be switched ON or OFF with a binary source. (**5398 Q EA StandBy**)
If no binary source is set the function is switched to ON.
When switching between ON/OFF and OFF/ON a switching transfer takes place in the control unit. The Y signal stands as per the offset and is not moved by gliding.

In standby the Y signal is set to 0.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5391	**Typ** StandBy type	set point multistate	--	2	0	value,text 0,MRP 1,ZQD
5392	**Q** Q StandBy	actual value deletable float	-infinity	+infinity	deleted	C
5393	**Tag** TO SBY day	set point float	0	30	20	C

No.	name of parameter	parameter typ	min	max	init	unit
5394	**Nacht** TASBY night	set point float	0	30	12	C
5395	**xsd** XSD StandBy	set point float	1	20	2	K
5396	**Ruecks** Back switch (ZQD)	set point integer	1	3	1	d
5397	**EA** Q EA StandBy	actual value deletable boolean	--	--	deleted	--
i008	**StBy** StandBy	actual value boolean	--	--	1	--

4.3.2.10.12. S348 Adaptive heating curve

Activation

Sub-function of	basic heating program	0 ... can be set once
Can be switched on-off via	**5639 Q EA Adapt HKL**	if not defined, ON

Function summary

The basic heating program controls the supply temperature due to the weather. The set point of the supply temperature is calculated as per the heating curve, which in turn is stipulated by the KH (parallel movement) and EF (steepness) parameters.

Function description

It is possible to set the progress of the heating curve with the DDC software object S348 adaptive heating curve. For this the parameters **5630 TS 20 to 5638 TS -20** at fixed (outside) temperature values parameterize the desired temperatures for the start.

When installing the DDC software menu EF and KH from the basic program are used as the basis for calculating the supply temperature values.

This heating curve is moved by comparing the set point for the room temperature, parameter **5180 TR set point**, with the actual room temperature, source parameter **5381 Q Room sensor** (xw room)**,** parallel to the relevant outside temperature value.

The**5184 Adaption permitted** parameter can permit or prohibit this adaption of the heating curve set via a binary source. If no source is set or is invalid it is also adapted.

The adaption occurs at the end of the utilization time if the utilization time is longer than 3 hours, otherwise after 24 hours of usage time (by the usage time program, remote day, Z influence day).

No adaption takes place for a difference less than 0.5 K from xw period.

Via a binary source the **5185 Reset** parameter can reset an adapted heating curve or a heating curve with user-defined sites back to its original process.

WARNING: If **5185 Reset** = ON, no adaption takes place.

The function of the DDC software object can be switched ON or OFF with a binary source. (**5693 Q EA Adapt HKL**) If no binary source is set the function is always ON.

Priorities

The feed lowering **5167 TS abs** set in the basic heating program also works for the TStarget of the adaptive heating curve in the night rules status.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5180	**TRsoll** TR set	set point float	-infinity	+infinity	20	C
5184	**Hkla erl** Adaption allowed	actual value deletable boolean	--	--	deleted	--
5185	**Res HKLa** Reset	actual value deletable boolean	--	--	deleted	--
5381	**Q Rt** Q room probe	actual value deletable float	-infinity	+infinity	deleted	C
5630	**TV 20** TV 20	set point float	-50	150	20	C
5631	**TV 15** TV 15	set point float	-50	150	33,5	C
5632	**TV 10** TV 10	set point float	-50	150	41	C
5633	**TV 5** TV 5	set point float	-50	150	48,5	C
5634	**TV 0** TV 0	set point float	-50	150	56	C
5635	**TV-5** TV -5	set point float	-50	150	63,5	C
5636	**TV-10** TV -10	set point float	-50	150	71	C
5637	**TV-15** TV -15	set point float	-50	150	78,5	C
5638	**TV-20** TV -20	set point float	-50	150	86	C
5639	**EA** Q EA Adaptive HKL	actual value deletable boolean	--	--	deleted	--
H01	**GLTY1** Z influence Y1	set point deletable float	0	100	deleted	%

The **5180 TR set point** and **5381 Q Room sensor** parameters are to be taken from the basic program.

Basis of calculation

on request

4.3.2.11. S321 Enthalpy

Function summary

The calculation of enthalpy or the water content occurs with the measured temperature and humidity values. The assignment of the humidity sensor and temperature sensor to calculate enthalpy can be freely selected.
This occurs using the source temperature and source rF parameters.

Special function:It is also possible to calculate the enthalpy values from a dry and a wet thermometer (psychometric principle). For this the source of the wet thermometer is entered in parameter 5502 Source temp humid.

- The calculated value of the absolute humidity is set in the absolute humidity parameter.
- The calculated value of the enthalpy result is set in the enthalpy parameter.
- The calculated value for the dewpoint is set in the dewpoint parameter.
- The calculated value of the relative humidity is set in the 5507 relative humidity parameter.

Note

The calculation of the enthalpy values with **5502 source temp.** Humidity has priority over the calculation with **5501 source rF**, i.e. when both sources are occupied.

It is possible to access these values using source setting from other objects (software and hardware objects, bases etc.) in the DDC4000 system.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5500	Source temperature	actual value deletable float	-50	100	deleted	C
5501	Source rF	actual value deletable float	0	100	deleted	%
5502	Source temp. feucht	actual value deletable float	-50	100	deleted	C
5505	Absolute humidity	actual value float	0	4000	0	g H2O/kg
5506	Enthalpie result	actual value float	-60	10000	0	kJ/kg
5507	Relative humidity	actual value float	0	100	0	%
5508	Dewpoint	actual value float	-50	100	0	C

4.3.2.12. S322 Sequence

Function summary

The DDC software object S322 sequence enables the signal of an analogue source to be divided into two independent sequences and provided as analogue values. These can be output for example using source setting through hardware objects.

By variably stipulating starting and end values, min and max limits, it is possible to set any format for the sequences that you desire. In addition a uncontrolled condition can be assigned to both sequences.

The analog input signal is set using source parameterizing **5520 Q Sequ**.

The starting and end value is set for each sequence. (for the 1st "target" sequence: 5521 YS1 Beg, 5522 YS1 End, for the second "target" sequence: 5527 YS2 Beg, 5528 YS2 End)

The result is sequences 5537 YS1 and 5538 YS2.

For YS1 and YS2 a fixed min and max limit (5524 YS1 min, 5526 YS1 Max, 5530 YS2 Min, 5532 YS2 Max) can be set.

It is also possible to create variable limits for all starting and end values (5521, 5522, 5527, 5528) as well as for all min and max values (5524, 5526, 5530, 5532) by setting analog sources. An analogue source has priority over the fixed entered value. I. e. if the source is valid the value of the source is operational otherwise the fixed value.

Via a binary source **5536 Q EA Notreg Sequ** the function of a sequence object can be switched to the uncontrolled condition. A status is assigned to the YS1 and YS2 outputs via parameter**5535 Notreg. Sequ**. In the uncontrolled condition the min-max limits continue to work.

There is the option of setting fixed values externally for the two sequences YS1 and YS2. For this the operating parameters are available via **BMS 44305 BMS Y1** and **44306 BMS Y2** as well as manual operation 7855 manual Y1 and 7856 manual Y2. The manual operation has a higher priority than the BMS operation. The min max limits can be overwritten with the BMS or manual operation.

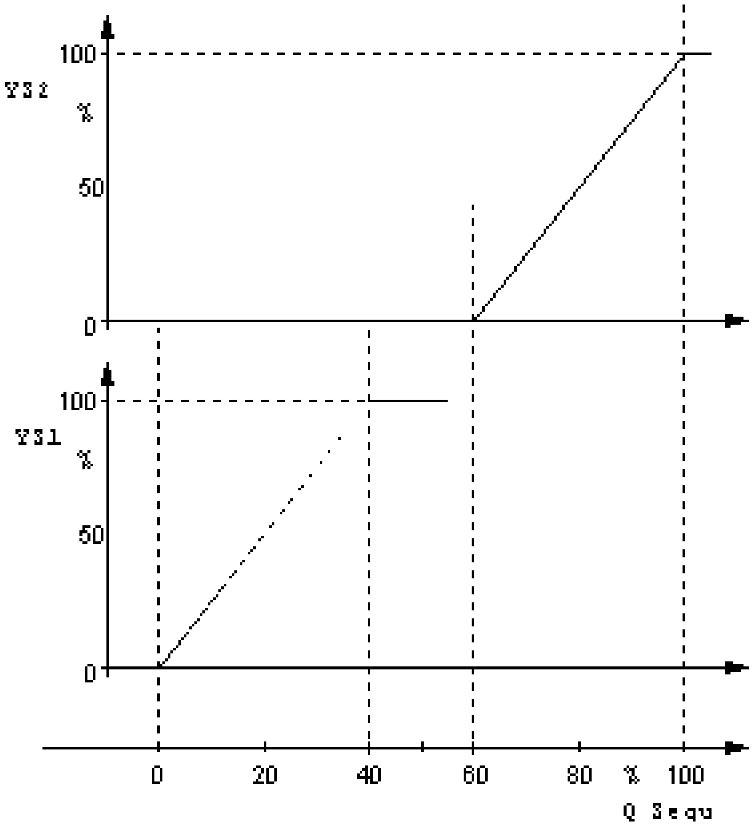
Priorities

1.	manual operation	manual Y1 / manual Y2
2.	BMS operation	BMS Y1 / BMS Y2
3.	Automatic/control	Q Sequ

Example

Classification of an analog signal to 40% of the fist "target" sequence, creation 20% xdz and the remaining 40% on the second "target" sequence.

$$YS = \frac{YSMax - YSMin}{YSEnd - YSBeg}(QSequ - YSBeg) + YSMin$$



Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5520	Q Sequ	actual value deletable integer	-2147483648	2147483647	deleted	--
5521	YS1 Beg	set point integer	0	100	0	%
5522	YS1 End	set point integer	0	100	50	%
5524	YS1 Min	set point integer	0	100	0	%
5526	YS1 Max	set point integer	0	100	100	%
5527	YS2 Beg	set point integer	0	100	50	%
5528	YS2 End	set point integer	0	100	100	%
5530	YS2 Min	set point integer	0	100	0	%

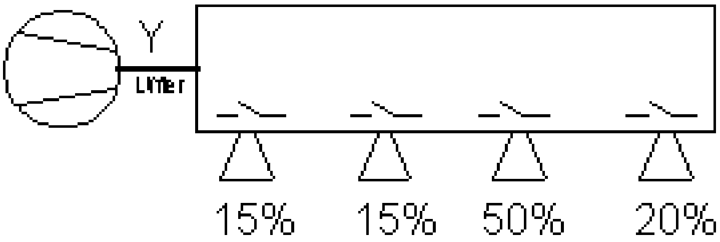
No.	name of parameter	parameter typ	min	max	init	unit
5532	YS2 Max	set point integer	0	100	100	%
5535	Not reg sequ	set point selection list	--	--	0	selection list No.,text 0,Y1 1,Y2
5536	Q EA Not reg Sequ	actual value deletable boolean	--	--	deleted	--
5537	YS1	actual value integer	0	100	0	%
5538	YS2	set point integer	0	100	0	%
7855	Hand Y1	set point deletable integer	0	100	deleted	%
7856	Hand Y2	set point deletable integer	0	100	deleted	%
7857	BMS Y1	set point deletable integer	0	100	deleted	%
7858	BMS Y2	actual value deletable integer	0	100	deleted	%

4.3.2.13. S323 Binary valuation

Function summary

An analog output signal is formed with the DDC software object depending on the binary signals. Each DDC software object calculates an analog output signal that is calculated from 8 binary input signals with a value that can be freely set.
The analogue output signals from several DDC software objects can for example be edited via the arithmetic object.

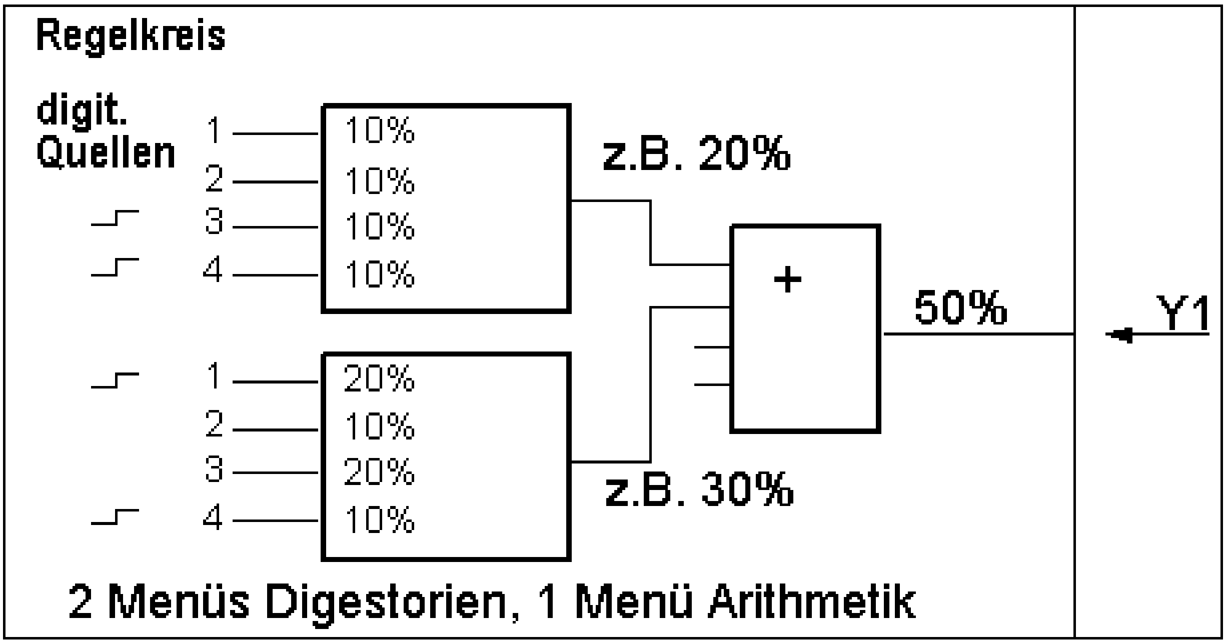
Note: This DDC software object is used for example for controlling the fans depending on the air flow.



The 8 binary input signals are set as source parameter binary valuation Q1...8.

Each binary input can be assigned a value between 0 and 100% with the 8 parameters **binary valuation W**. As soon as a binary input is switched to log. "1" its valuation is switch in addition to parameter **binary valuation Y**.

Example:



Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5540	**Y** Binary values Y	actual value integer	0	100	0	%
5541	Binary values Q1	actual value deletable boolean	--	--	deleted	--
5542	Binary values Q2	set point deletable boolean	--	--	deleted	--
5543	Binary values Q3	actual value deletable boolean	--	--	deleted	--
5544	Binary values Q4	actual value deletable boolean	--	--	deleted	--
5545	Binary values W1	set point integer	0	100	25	%
5546	Binary values W2	set point integer	0	100	25	%
5547	Binary values W3	set point integer	0	100	25	%
5548	Binary values W4	set point integer	0	100	25	%
5549	Binary values W5	set point integer	0	100	25	%
5550	Binary values W6	set point integer	0	100	25	%
5551	Binary values W7	set point integer	0	100	25	%
5552	Binary values W8	set point integer	0	100	25	%
5555	Binary values Q5	actual value deletable boolean	--	--	deleted	--
5556	Binary values Q6	actual value deletable boolean	--	--	deleted	--
5557	Binary values Q7	actual value deletable boolean	--	--	deleted	--
5558	Binary values Q8	actual value deletable boolean	--	--	deleted	--

4.3.2.14. S324 Scaling

Function summary

Mit dem DDC-Softwareobjekt S324 Skalierung kann einem analogen Signal ein neuer Wertebereich zugeordnet werden. Der Wertebereich wird durch einen Anfangs- und einen Endwert definiert.

A new value range can be assigned to an analog signal with the DDC software object S324 scaling. The value range is defined by a start and an end value.

In parameter **5550 Q Scal sensor** the source of the analog signal to be scaled is set. Each analog signal in the DDC4000 system can be scaled. The scaling refers to the value range of the input magnitude (0..100%).

Parameters **5551 start scaling** and **5552 End scaling** set the value range. The scaled value is provided in parameter **5554 scaling value**.

Using parameter **5553 min output delta** the analog signal can be calmed, e.g. a sensor value.
If e.g. "0.0" is entered all changes are calculated and provided as a scaled value.
If e.g. "0.5" is entered all changes greater than 0.5 units are re-calculated and provided as a scaled value.

Parameter **5555 attentuation** works as a PT1-Glide. If the input signal value changes (**5550 Q Scal sensor**) in jumps a 63% change in value from the original input jump is achieved at the output (**5554 Value Scaling**) after the attentuation time.

Please note:

The analog signal for measuring element KP10 (sensor inputs that are set for KP10) can not be scaled.

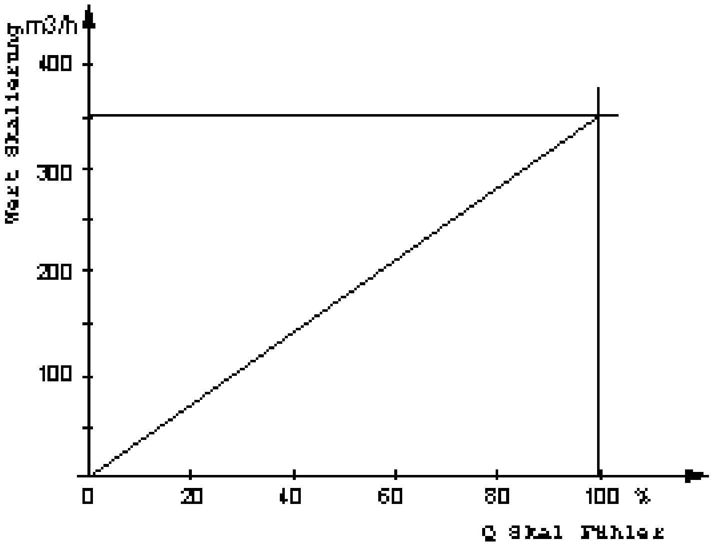
If the input signal (**5550 Q Scal sensor**) is deleted or invalid the output (**5554 value scaling**) = 0,0.

If the input signal < 0 %, the output signal takes the value of its lower limit (**5551 start scaling**) or if > 100 % the value of its upper limit (**5552 End scaling**).

Scaling value = (End of scaling – Start of scaling) * Scal sensor / 100 % + start of scaling

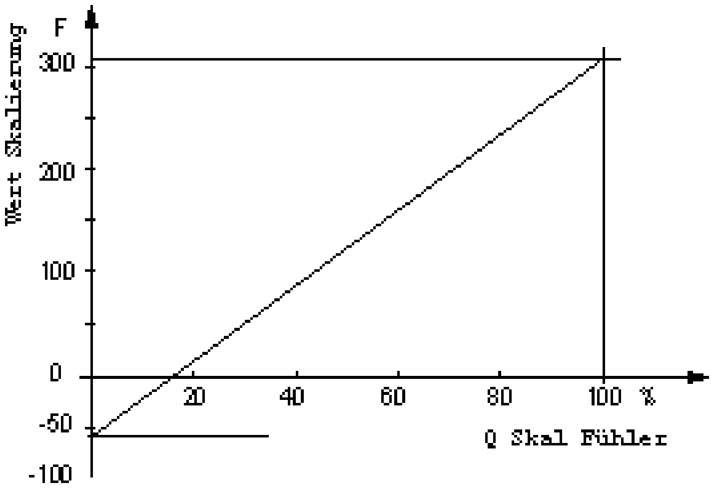
Example 1:
A 0..10 V signal should be converted to 0..350 m³/h (depicted as 0.100 %)

Start of range 0.0 (0 %)
End of range 350.0 (100 %)
Unit m³/h



Example 2:
An analog signal (0..100 %) should be converted into Fahrenheit

Start of range -58.0 (= 0 %)
End of range 302.0 (= 100 %)
Unit F



Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5550	**Q_B** Q scal sensor	actual value deletable float	-infinity	+infinity	deleted	--
5551	**Anf** Begin scaling	set point float	-infinity	+infinity	0	--
5552	**Ende** End scaling	set point float	-infinity	+infinity	0	--
5553	**Delta** min. output delta	set point float	0	10	0	--
5554	**Wert** Value scaling	actual value float	-infinity	+infinity	0	--
5555	**PT1** Dampening	set point deletable integer	1	3600	deleted	s

4.3.2.15. S325 MinMaxAverage

Function summary

Using the DDC software object S325 min/max/average the smallest, largest and average value can be calculated from up to 8 analog signals. Each of the 8 analog signals can be occupied with a weighting factor.

The 8 analog signals are recorded via source parameterizing 1..8 **MMM sensor** 1..8. The factors for weighting the individual analog signals are to be set in 11..18 **MMM Factor** 1..8.

In addition via the binary sources 21..28 **Q EA sensor** 1..8 there is also the opportunity to remove each individual analog source from the min/max/average calculation. If the binary source is switched on or not source set the corresponding analog source is included as per its factor in the calculation.

The calculated values for the min, max and average calculation are provided on parameters 31 **Min selection**, 32 **Max selection** and 33 **average**. It is possible to access these values using source setting from other software and hardware objects of the DDC4000 system.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**B1** MMM Sensor 1	actual value deletable float	-infinity	+infinity	deleted	--
2	**B2** MMM Sensor 2	actual value deletable float	-infinity	+infinity	deleted	--
3	**B3** MMM Sensor 3	actual value deletable float	-infinity	+infinity	deleted	--
4	**B4** MMM Sensor 4	actual value deletable float	-infinity	+infinity	deleted	--
5	**B5** MMM Sensor 5	actual value deletable float	-infinity	+infinity	deleted	--
6	**B6** MMM Sensor 6	actual value deletable float	-infinity	+infinity	deleted	--
7	**B7** MMM Sensor 7	actual value deletable float	-infinity	+infinity	deleted	--
8	**B8** MMM Sensor 8	actual value deletable float	-infinity	+infinity	deleted	--
11	**F1** MMM Factor 1	set point float	0	10	1	--
12	**F2** MMM Factor 2	set point float	0	10	1	--

No.	name of parameter	parameter typ	min	max	init	unit
13	**F3** MMM Factor 3	set point float	0	10	1	--
14	**F4** MMM Factor 4	set point float	0	10	1	--
15	**F5** MMM Factor 5	set point float	0	10	1	--
16	**F6** MMM Factor 6	set point float	0	10	1	--
17	**F7** MMM Factor 7	set point float	0	10	1	--
18	**F8** MMM Factor 8	set point float	0	10	1	--
21	**QEA1** Q EA Sensor 1	actual value deletable boolean	--	--	deleted	--
22	**QEA2** Q EA Sensor 2	actual value deletable boolean	--	--	deleted	--
23	**QEA3** Q EA Sensor 3	actual value deletable boolean	--	--	deleted	--
24	**QEA4** Q EA Sensor 4	actual value deletable boolean	--	--	deleted	--
25	**QEA5** Q EA Sensor 5	actual value deletable boolean	--	--	deleted	--
26	**QEA6** Q EA Sensor 6	actual value deletable boolean	--	--	deleted	--
27	**QEA7** Q EA Sensor 7	actual value deletable boolean	--	--	deleted	--
28	**QEA8** Q EA Sensor 8	actual value deletable boolean	--	--	deleted	--
31	**min** Min select	actual value float	-infinity	+infinity	0	--
32	**max** Max select	actual value float	-infinity	+infinity	0	--
33	**mittel** Middle value	actual value float	-infinity	+infinity	0	--

4.3.2.16. S326 Time gliding

Activation

Sub-function of	-	10 times can be set

Function summary

This DDC software object can be used for example as a command value in DDC software objects, e.g. for "time-dependent" glide of a set point.

Function description

With the DDC software object time glide a value that is larger or smaller depending on the time is created. The bigger or smaller is set as a slope in the parameters **5680 slope +/h** and **5681 slope -/h**. For this the desired slope is defined as a numerical value 0.01...999 per hour.

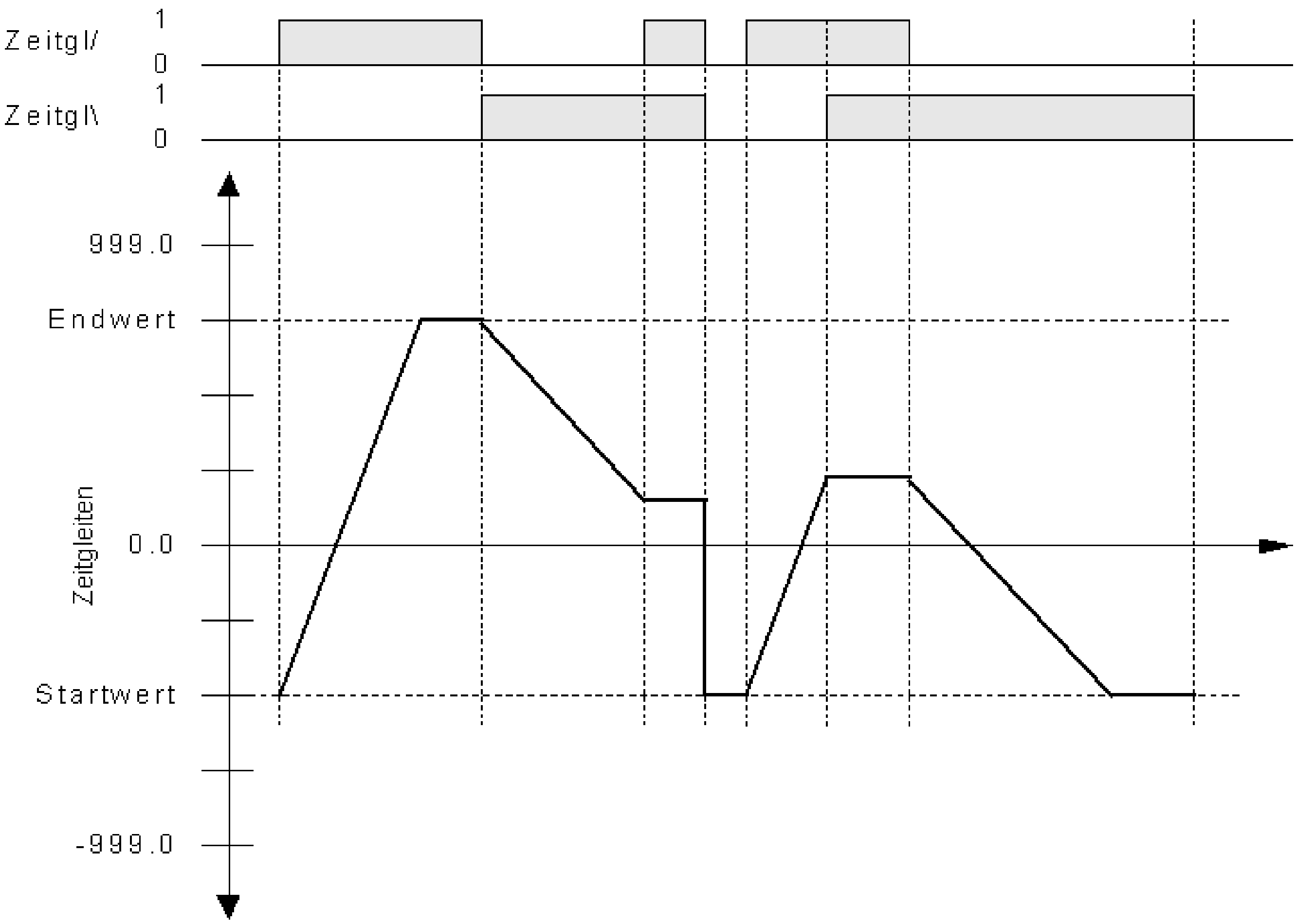
The value produced from the slope (positive or negative) and the time passed is indicated in parameter **5684 time glide**.

A **starting value** and an **end value** must be stipulated. The gliding starts with the starting value and ends with the end value.

It is possible to access this value with source parameterizing.

The time glide is controlled as follows using the two binary source parameters **timegl/** and **timegl**:

		Time gliding	
Timegl/	Timegl\	Start value < End value	Start value > End value
0	0	The value is reset to the start value	The value is reset to the start value
1	0	Value becomes larger as per **slope+/h** **Start value -> End value**	Value becomes larger as per **slope+/h** **End value -> Start value**
0	1	Value becomes smaller as per **slope+/h** **End value -> Start value**	Value becomes smaller as per **slope+/h** **Start value -> End value**
1	1	No changes	No changes



Example

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5680	**Steig+** Slope +/h	set point float	0	999	1	--
5681	**Steig-** Slope -/h	set point float	0	999	1	--
5682	**Auf** Time gl/	actual value deletable boolean	--	--	deleted	--
5683	**Ab** Time gl\	actual value deletable boolean	--	--	deleted	--
5684	**Ausg** Time slides	actual value float	-infinity	+infinity	0	--
5685	**Start** Time slides	set point float	-infinity	+infinity	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5686	**Ende** End value	set point float	-infinity	+infinity	0	--

4.3.2.17. S327 Pulse counting

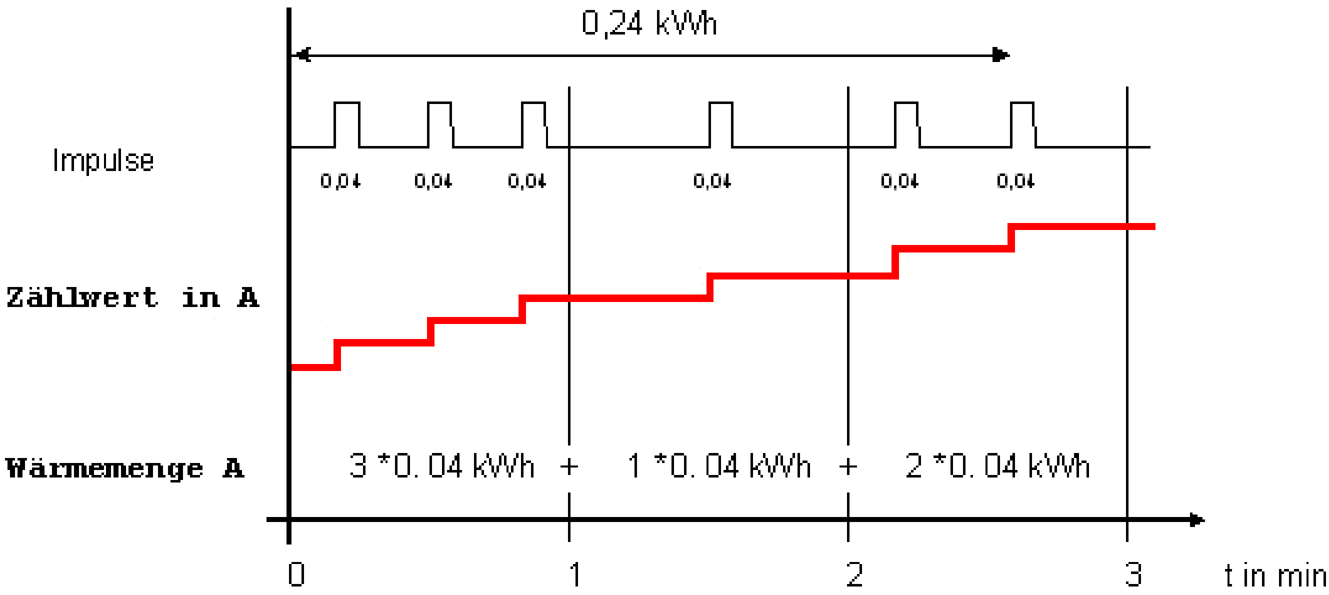
Function summary

The DDC software object S327 impulse counter has the function of counting operating cycles. The counted pulses can for example be scaled for calculating the heat volume.

The pulses are recorded with the counting parameter 5695 **count value in A**. The recording and counting takes place permanently and always with the 0/1 flank of the pulse occurring. The heat volume and delta heat volume are calculated in a fixed interval of 1 minute. The heat capacity is calculated in an interval as per parameter 5698 **calculation interval** (Basis 1 minute).

Each counting value change is firmly assigned a heat volume parameters 5693 **Scaling A** and 5694 **Scaling A Exp**.

The max. counting frequency depends on the hardware input. (pulse counting or digital input). For example the output of a counting object F015 **FO-Count** can be used as a source for the counting input. But it is also possible to link the counting value of any binary plant parameter as a source (refer to FSource documentation).



Example:

e.g. Scaling A = 4 and Scaling A EXP = -2 means: 4 x 10-2 = 0.04 kWh is added for each pulse.

The result appears in parameter 5690 **heat volume A** based on with the unit kWh. The unit can be changed.

Via a 0/1 flank of the binary source parameter 5696 **Q Reset heat volume A** the 5691 **Delta heat volume A** counted to date is reset to 0.

The 1/0 flank of the binary source parameter starts 5691 **Delta heat volume A** counting again. We recommend therefore the use of a sensor for the reset.

The calculated volumes of 5690 **heat volume A** and 5691 **Delta heat volume A** can be reset or set by default both by the DDC4000 Central Unit keyboard and the BMS.

The function of the DDC software object can be switched ON (Status = 1) or OFF (Status = 0) with a binary source. (5697 **Q EA pulse**)
This makes counting with a certain time range possible.

If no binary source is set the function is switched to ON.

In parameter 5692 **heat capacity A** the current calculated heat capacity is entered.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5690	Amount of heat A	set point integer	0	100000000	0	kWh
5691	Delta amount of heat A	set point integer	0	100000000	0	kWh
5692	Heat power A	actual value integer	0	100000000	0	kW
5693	Scaling A	set point float	0,001	100000	1	--
5694	Scaling A Exp	set point integer	-9	9	0	--
5695	Impulse in A	actual value integer	0	2147483647	0	--
5696	Q Reset amount of heat A	actual value deletable boolean	--	--	deleted	--
5697	Q EA Impulse	actual value deletable boolean	--	--	deleted	--
5698	Calculation interval	set point integer	1	60	1	min

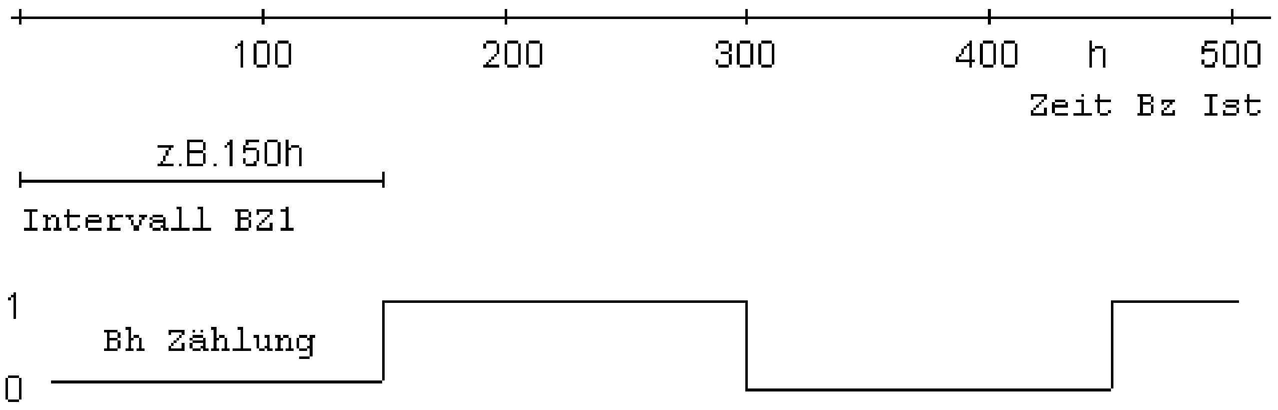
4.3.2.18. S328 Operation hours

Function summary

The operating hours are counted with the DDC software object S328 operating hours.

The count takes place if the binary source parameter 5702 **Q Input Bz** is logical 1. The count takes place in hours and minutes. The full hours are depicted on parameter 5700 **time BZ**. The minutes are counted in parameter 5705 **minutes**.

Control functions can be released after the end of stipulated time intervals. When exceeding the time interval 5701 **Interval BZ** parameter 5704 **Bh counting** is set to 1. If the time interval is exceeded again parameter 5704 **Bh counting** is reset to 0. Each time the time interval is exceeded another change takes place. This makes it possible for example to switch time-dependent pumps.



The operating hour counter can be reset to 0 with the binary source parameter 5703 **Q Reset BZ**.

Parameters

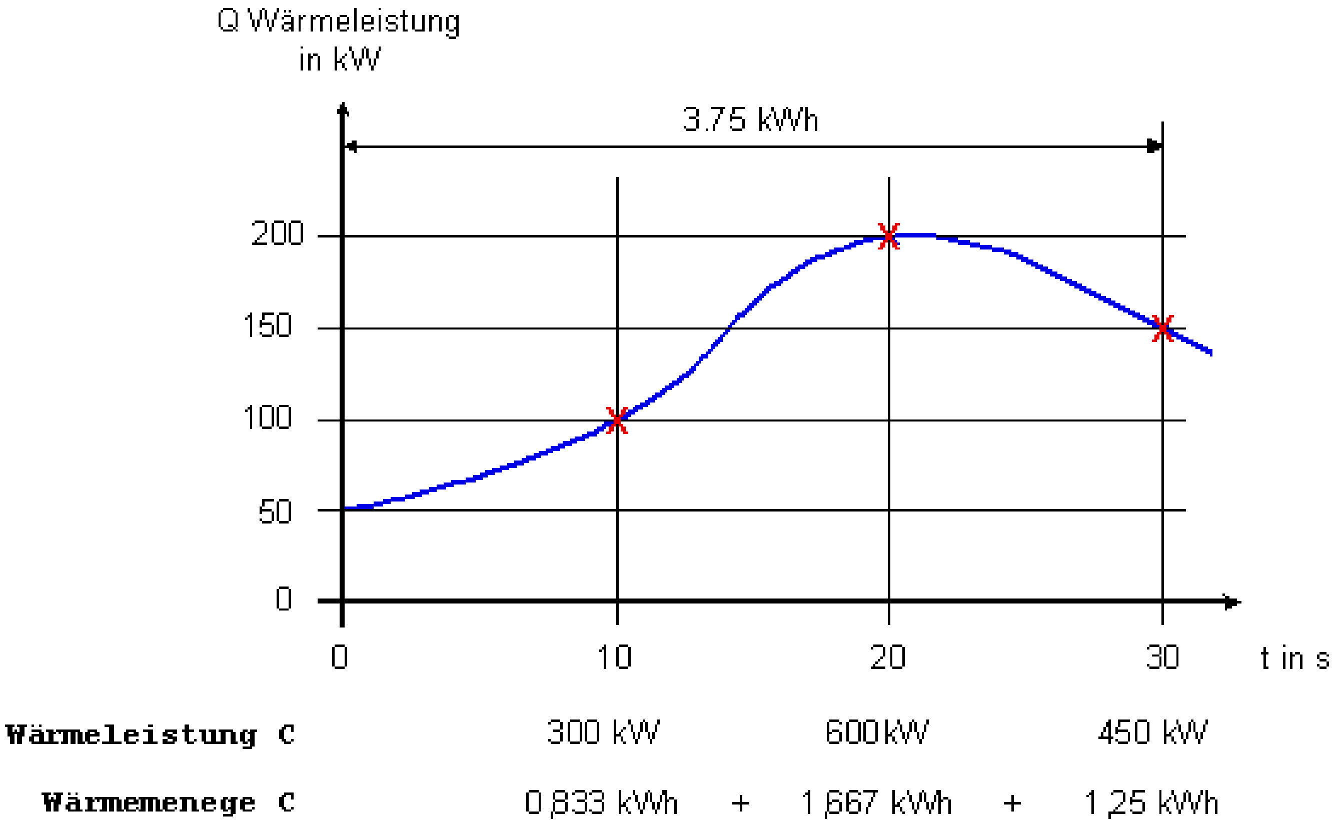
No.	name of parameter	parameter typ	min	max	init	unit
5700	**t** Time BZ is	set point integer	0	99999	0	h
5701	Interval BZ 1	set point integer	0	9999	9999	h
5702	**Q** Q input BZ	actual value deletable boolean	--	--	deleted	--
5703	**Q_R** Q Reset BZ	actual value deletable boolean	--	--	deleted	--
5704	Bh counter	actual value boolean	--	--	0	--
5705	Minutes	set point integer	0	59	0	min

4.3.2.19. S329 Heat volume P

Function summary

The function of software object heat volume P is to measure the heat capacity provided as an analog signal and to count the calculated heat volume. The heat capacity is recorded with the analog source parameter Q heat capacity and can be scaled using the scaling and scaling exp parameters.

With scaling via parameter 5715 **Scaling C** and 5716 **Scaling C Exp** the heat capacity is set to 100 % = 10 V. The scaled heat capacity is shown in 5711 **heat capacity C**. This results in calculating the heat volume that is depicted on parameter 5712 **heat volume C**. The heat capacity and heat volume are calculated in a fixed interval of 10 seconds.



Example:

e.g. Scaling C = 3 and scaling C EXP = +2 means the maximum value at 100 % heat capacity corresponds to 3 x 10+2 = 300 kW.

Via a 0/1 flank of the binary source parameter 5714 **Q Reset heat volume A** the 5713 Delta heat volume C counted to date is reset to 0.

The 1/0 flank of the binary source parameter starts 5713 **Delta heat volume** counting again. We recommend therefore the use of a sensor for the reset.

The calculated volumes of 5712 **heat volume A** and 5713 **Delta heat volume C** can be reset or set by default both by the DDC4000 Central Unit keyboard and the BMS.

The function of the DDC software object can be switched ON (Status = 1) or OFF (Status = 0) with a binary source (Status = 0). (5717 **Q EA Wmber_P**)

If no binary source is set the function is switched to ON.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5710	Q heat power	actual value deletable float	0	+infinity	deleted	kW
5711	Heat power C	actual value float	0	100000000	0	kW
5712	Amount of heat C	set point float	0	100000000	0	kWh
5713	Delta amount of heat C	set point float	0	100000000	0	kWh
5714	Q Reset amount of heat C	actual value deletable boolean	--	--	deleted	--
5715	Scaling C	set point float	0,1	999,9	1	--
5716	Scaling C Exp	set point integer	-3	3	0	--
5717	Q EA Wmber_P	actual value deletable boolean	--	--	deleted	--

4.3.2.20. S330 Heat volume DT

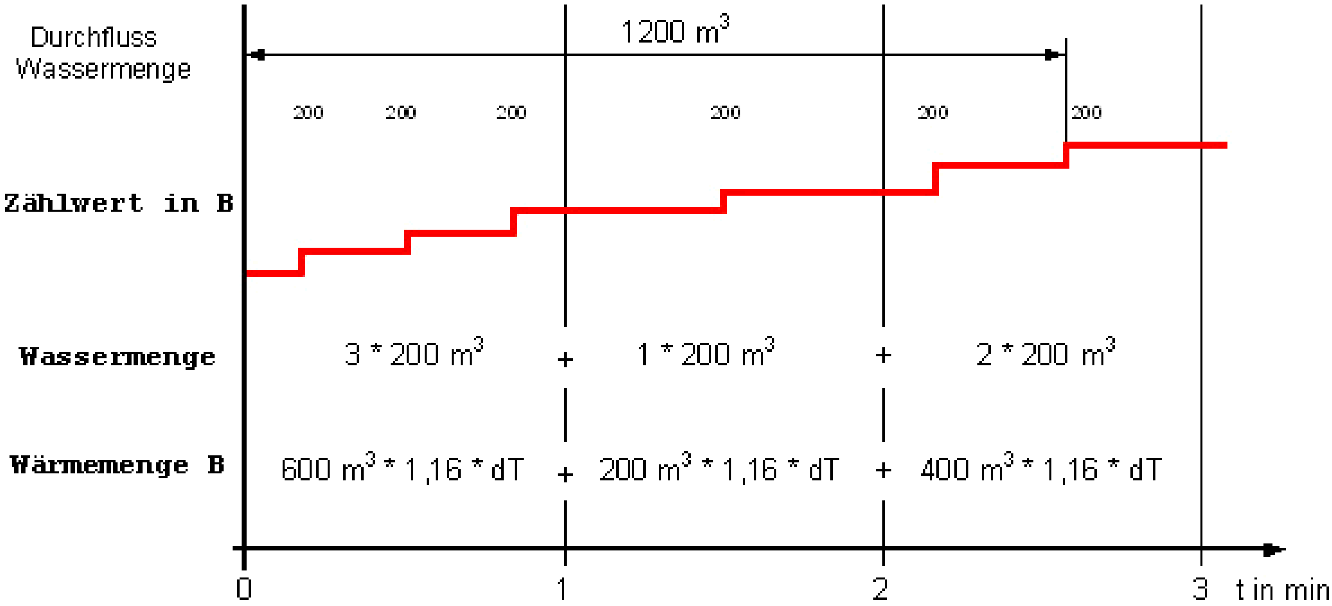
Function summary

The function of the DDC software object is to calculate the heat volume using the temperature difference and flow volume. The flow volume is recorded via a pulse counter.

The temperatures are recorded by the source parameters WMNG **sensor warm** and WMNG **sensor cold**.

The flow volume is recorded with the counting parameter 5722 **count value in B**. Each counting value change is firmly assigned a flow volume via parameter 5729 **Scaling B** and 5730 **Scaling B Exp**.

The heat volume is calculated from the temperature difference and flow volume. The counting values are recorded continuously. The calculated values are depicted by the minute in parameter 5725 **heat volume B**.
The water volume calculated from the pulse counter and scaling is depicted on parameter 5727 **water volume** with the unit m³. The volume flow calculated in the same way is depicted in parameter 5723 **volume flow** with the unit m³/h. The units can be changed.



Example:

e.g. Scaling B = 2 and Scaling EXP B = +2 means: 2 x 10 + 2 = 200 m³ is added for each pulse.

Via a 0/1 flank of the binary source parameter 5731 **Q Reset heat volume A** the 5726 **Delta heat volume B** counted to date is reset to 0.

Via a 0/1 flank of the binary source parameter 5732 **Q Reset water volume A** the 5728 **Delta water volume** counted to date is reset to 0.

The 1/0 flank of the binary source parameter starts 5726 **Delta heat volume B** or 5728 **delta water volume** counting again. We recommend therefore the use of a sensor for the reset.

The calculated volumes of 5725 **heat volume B**, 5726 **Delta heat volume B**, 5727 **water volume** and 5728 **delta water volume** can be reset or set by default both by the DDC4000 Central Unit keyboard and the BMS.

The function of the DDC software object can be switched ON (Status = 1) or OFF (Status = 0) with a binary source (Status = 0) (5733 EAWB).
If no binary source is set the function is switched to ON.

Note

A counting object **F015 FO count** can be used for example as a source for the counting input 5722 **Counting value in B**. But it is also possible to link the counting value of any binary plant parameter as a source (refer to FSource documentation).

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5720	WMNG Sensor warm	actual value deletable float	-infinity	+infinity	deleted	C
5721	WMNG Sensor kalt	actual value deletable float	-infinity	+infinity	deleted	C
5722	Impulse in B	actual value integer	0	2147483647	0	--
5723	Volume current	actual value float	0	9999999	0	m/h
5724	Heat power B	actual value float	0	100000000	0	kW
5725	Amount of heat B	set point float	0	+infinity	0	kWh
5726	**Delta W** Delta amount of heat B	set point float	0	+infinity	0	kWh
5727	amount of water	set point float	0	+infinity	0	m
5728	Delta amount of water	set point float	0	+infinity	0	m
5729	Scaling B	set point float	0,1	999,9	1	--
5730	Scaling B Exp	set point integer	-3	3	0	--
5731	Q Reset amount of heat B	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5732	Q Reset amount of water	actual value deletable boolean	--	--	deleted	--
5733	**EAWB** WmCalcEA	actual value deletable boolean	--	--	deleted	--

Formulas

Q = V * p * cP * DT
heat volume = Water volume * 1.16 * DTemperature

Q = heat volume (in kWh)
V = Volume = water volume (in m^3)
p = Density of water = 1000 kg/m^3
cP = heat capacity = 1.16 Wh/(kg * K)
DT = DTemperature = sensor warm – sensor cold (in K)

4.3.2.21. S333 Ring counter

Function summary

A maximum of 12 binary outputs are switched onwards cyclically wit the DDC software object S333 ring counter.

The switching on takes place automatically by stipulating a time span a n d / o r changing the status of a binary source.

After installing the software object the first output **5763 Ring output 1** is switched on.

Parameter **5759 starting time** provides the opportunity to precisely determine the start of switching on by including a digital source for example from a time program. The second switching on occurs after the end of the set **time span** or the first time the binary input **Q Ring** is switched.

The default **starting time** is deleted, i. e. the calculation of the switching on starts immediately.

The following options are possible for switching the binary outputs:

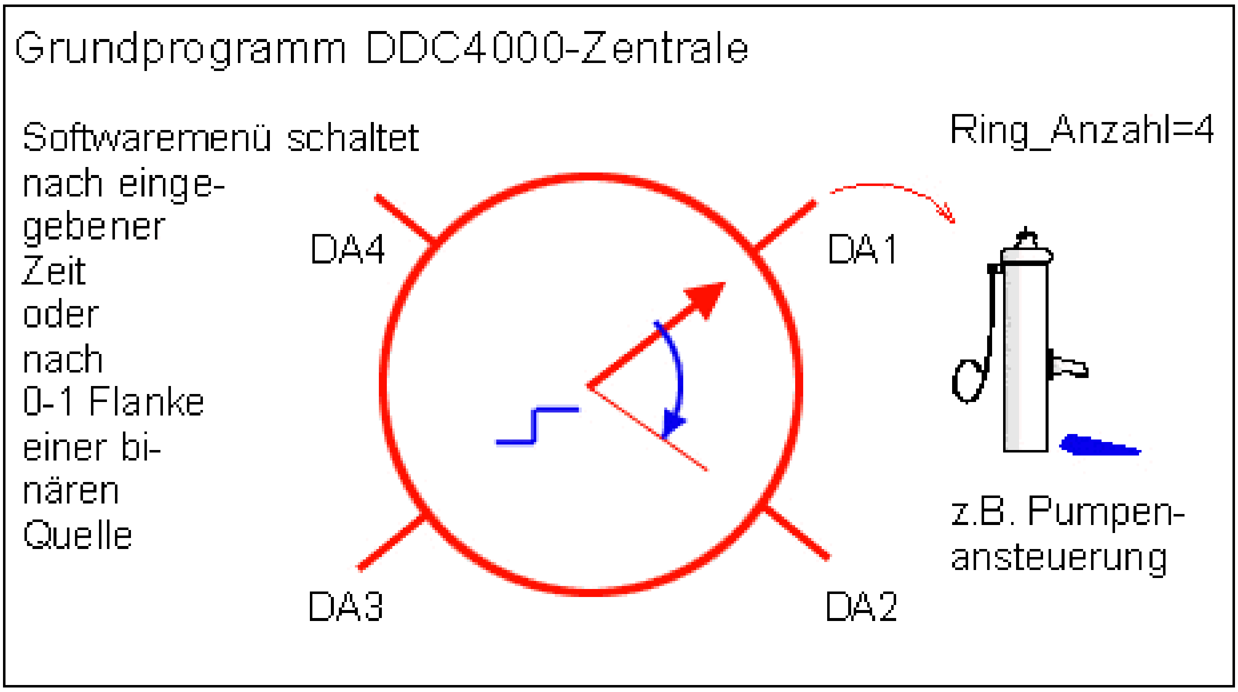
1. Switching on the binary output to the subsequent output takes place after the end of the time stipulated in parameter 5761 **time span**. The time is entered in minutes (m³ 1 minute) and/or
2. The switching on of the binary output to the following output is done via a binary source 5762 **Q Ring**. This switching on occurs independently of the starting time.

If parameter value 5761 **time span** is deleted the ring counter stays at the current level. It can only be switched on via a binary source.

With parameter 5760 **Ring** number the number of the outputs to be controlled 5763 .. 5774 **Ring output** 1 .. 12 is stipulated. It is possible to control 2 to 12 outputs.

Example

Pump switching



Usable for:

- automatic pump switching
- automatically changing the heat exchanger etc.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5759	Start timepoint	actual value deletable boolean	--	--	deleted	--
5760	Ring Nr. of	set point integer	2	12	4	--
5761	Ring time span	set point deletable integer	1	2147483647	10080	min
5762	Q Ring	actual value deletable boolean	--	--	deleted	--
5763	Ring exit 1	actual value boolean	--	--	0	--
5764	Ring exit 2	actual value boolean	--	--	0	--
5765	Ring exit 3	actual value boolean	--	--	0	--
5766	Ring exit 4	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5767	Ring exit 5	actual value boolean	--	--	0	--
5768	Ring exit 6	actual value boolean	--	--	0	--
5769	Ring exit 7	actual value boolean	--	--	0	--
5770	Ring exit 8	actual value boolean	--	--	0	--
5771	Ring exit 9	actual value boolean	--	--	0	--
5772	Ring exit 10	actual value boolean	--	--	0	--
5773	Ring exit 11	actual value boolean	--	--	0	--
5774	Ring exit 12	actual value boolean	--	--	0	--

4.3.2.22. S334 Spreadsheet function

Function summary

Using the DDC software object S334 table function a new analog output signal Y is formed from an analog input signal X. The value assignment occurs via up to 10 value pairs X/Y. The DDC software object is used for example to linearize unlinearities from machine parts in the technical operation plant (e.g. non-linear transfer behavior of heat ransfer units).

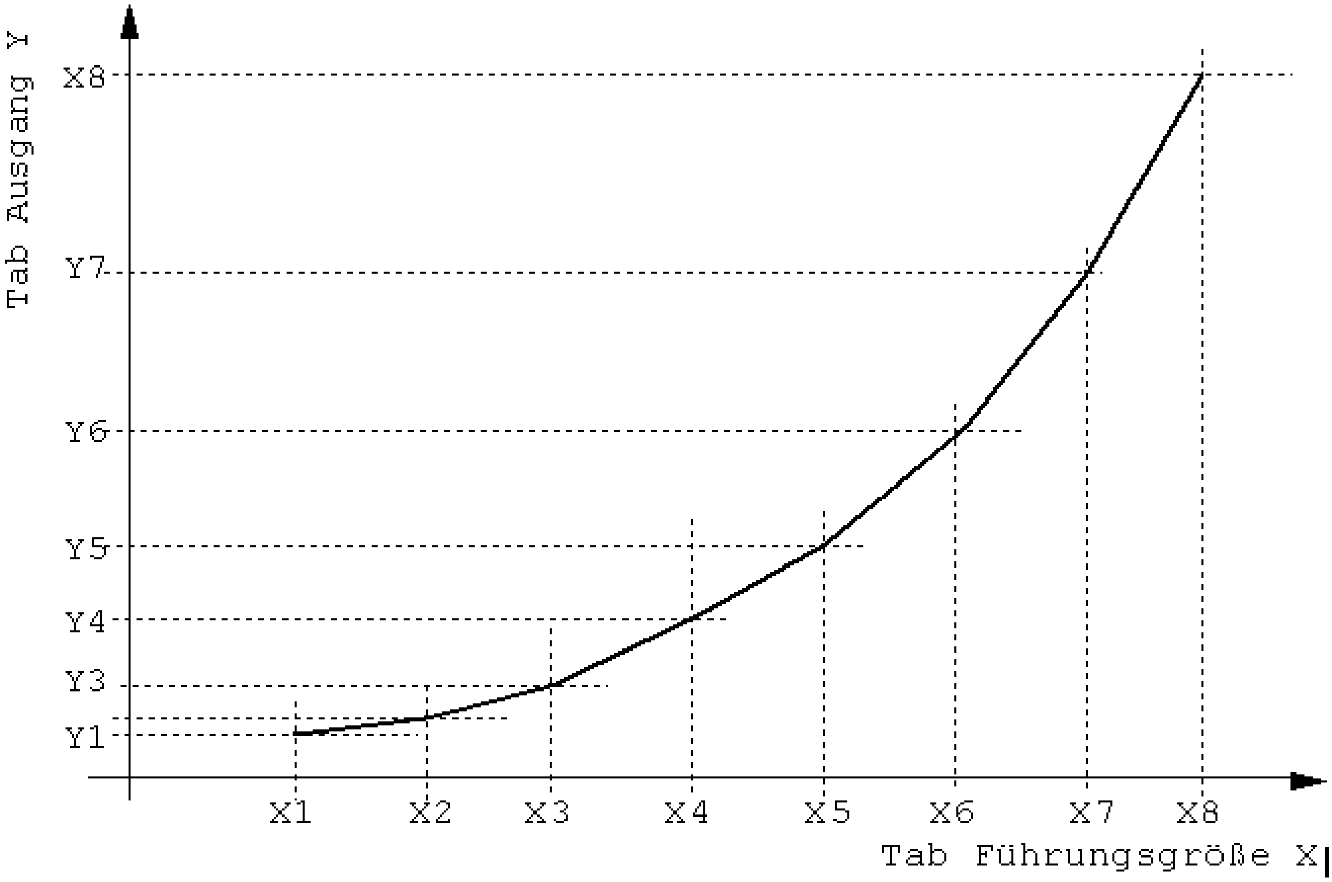
The analog input signal X is set as source parameter 5791 **Tab command value X**.

The output signal Y calculated in line with up to 10 X/Y value pairs is depicted on parameter 5792 **Tab output Y**.

An output signal Y is calculated by interpolation for all input signals that are between the set value pairs X/Y. This requires complete upward setting for the input signals.

- The input signal setting must start with X1/Y1.
- No X/Y inputs between the first and last X/Y value pair can be released.
- The X values must be set going up: X1 < X2 < X3 ...
- The interpolation ends with the last X/Y value pair, e.g. X1/Y1 ... X5/Y5.

Immediately after activating the DDC software object all input parameters (command value, X/Y inputs) are deleted and have to be set first. The Y output signal is set to 0 for this time. If the input signal X wanders with an active function beyond the upper/lower value pair X/Y the most recently calculated value is retained as output signal Y.



Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5791	Tab lead size X	actual value deletable float	-infinity	+infinity	deleted	--
5792	Tab exit Y	actual value float	-infinity	+infinity	0	--
5801	Table X1	set point deletable float	-infinity	+infinity	deleted	--
5802	Table Y1	set point deletable float	-infinity	+infinity	deleted	--
5803	Table X2	set point deletable float	-infinity	+infinity	deleted	--
5804	Table Y2	set point deletable float	-infinity	+infinity	deleted	--
5805	Table X3	set point deletable float	-infinity	+infinity	deleted	--
5806	Table Y3	set point deletable float	-infinity	+infinity	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5807	Table X4	set point deletable float	-infinity	+infinity	deleted	--
5808	Table Y4	set point deletable float	-infinity	+infinity	deleted	--
5809	Table X5	set point deletable float	-infinity	+infinity	deleted	--
5810	Table Y5	set point deletable float	-infinity	+infinity	deleted	--
5811	Table X6	set point deletable float	-infinity	+infinity	deleted	--
5812	Table Y6	set point deletable float	-infinity	+infinity	deleted	--
5813	Table X7	set point deletable float	-infinity	+infinity	deleted	--
5814	Table Y7	set point deletable float	-infinity	+infinity	deleted	--
5815	Table X8	set point deletable float	-infinity	+infinity	deleted	--
5816	Table Y8	set point deletable float	-infinity	+infinity	deleted	--
5817	Table X9	set point deletable float	-infinity	+infinity	deleted	--
5818	Table Y9	set point deletable float	-infinity	+infinity	deleted	--
5819	Table X10	set point deletable float	-infinity	+infinity	deleted	--
5820	Table Y10	set point deletable float	-infinity	+infinity	deleted	--

4.3.2.23. S335 Sensor switching

Function summary

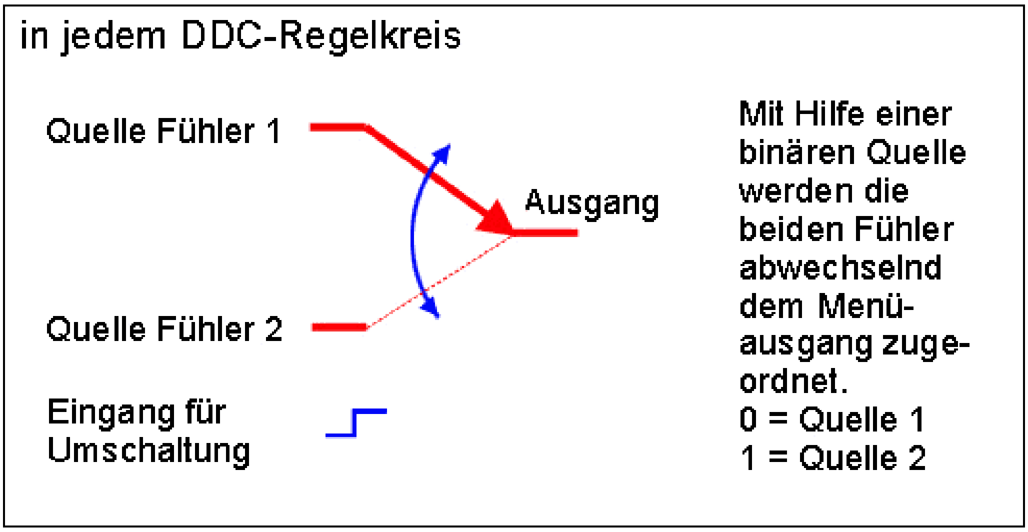
The DDC software object S335 sensor switching is used to switch between any two analog values or sensors.

The two analog values to be switched are set in source parameters 1 **Q1** and 2 **Q2**.

The switching is undertaken with the binary source parameter 3 **switch**.

If 3 **switch** has the value 0, is invalid or has been deleted the value of 1 is switched to **Q1**.
If 3 **switch** has the value 1, the value of 2 is switched to **Q2**.

The result is depicted in parameter 4 **output**.
This value can be used as an analog source in the complete DDC4000 system.



Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Q1** Q1	actual value deletable float	-infinity	+infinity	10	--
2	**Q2** Q2	actual value deletable float	-infinity	+infinity	deleted	--
3	**Umschalt** Q Switchover	actual value deletable boolean	--	--	deleted	--
4	**Ausgang** Output	actual value float	-infinity	+infinity	0	--

4.3.2.24. S337 Basic program fixed value

Activation

GP	Fixed value	can be installed up to 12 x

A PID regulator can be replaced by 4 fixed value regulators.

Function summary

The fixed value software object is a PI control with a sequence.

The fixed value regulator program is a PI regulator with a Y output. Other parameters are for advanced functions, e.g.

- P regulator
- Set point conversion
- Set point glide
- Y limitation
- Y set.

Function description

The **5102 source control variable** parameter can be assigned any analog value in the DDC4000 system. The control can be switched between two set points, **5100 XS** and **5107 XS2**. The switch occurs via the **5108 Q XS XS2** parameter that can be assigned any binary value.

It also possible to glide the current set point according to any analog command value (e. g. the outside temperature). The analog value is connected with the **5250 command value SG** parameter. The set point gliding is calculated from the values for **5251 glide start SG**, **5252 glide end SG** and **5253 EF SG,** as per the set point glide functions described for the PID sub-menu.

The effect of the fixed value control can be set to either heating or cooling via the **5124 Sequence** parameter. A binary source in **5129 Q sequence converter** can also switch the effect of the sequence.

The fixed value control works depending on the set reset time **5106 tN** as a P or PI control. The proportional range is set in the **5120 XPY1** parameter.

The current Y value is indicated in the **5110 Y1** parameter. The Y output can be limited via **5141 Y1 min** and **5145 Y1 max**.

The Y output value calculated by the control unit can be overwritten by enforced intervention. This is possible on the one hand via the setting for the value in **5324 Yfix**. If the binary source in **5327 Q Y-Fix** "1", the Y output is set to the Yfix value.

Furthermore enforced setting is also possible via **5328 manual influence Y1** and **5329 analog BMS influence Y1**.

The function of the fixed value regulator can be switched ON or OFF via a binary source in **5178 Source EA fixed value**.

Priorities

The Y signal is controlled with the following priority.

Priority	Function
Highest	Manual influence Y1
	analog BMS influence Y1
	Yfix
lowest	Control

Note

The enforced control of the Y output via **5328 manual influence Y1** or **5329 analog BMS influence Y1** also works when the fixed value control has been switched OFF via **5178 source EA fixed value**.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5100	**XS** XS	set point float	-infinity	+infinity	20	--
5102	**QReg** Source controlled variable	actual value deletable float	-infinity	+infinity	deleted	--
5106	**tN** tN	set point deletable float	1	+infinity	3	min
5107	**XS2** XS 2	set point float	-infinity	+infinity	17	--
5108	Q XS XS2	actual value deletable boolean	--	--	deleted	--
5110	**Y** YL1	actual value float	0	100	0	%
5120	**XPY1** XPY1	set point float	0,5	999,9	10	--
5124	Sequence	set point multistate	--	2	1	value,text 0,/ 16,\

No.	name of parameter	parameter typ	min	max	init	unit
5129	Q Sequence inversion	actual value deletable boolean	--	--	deleted	--
5141	**Y1min** Y1 min	set point float	0	100	0	%
5145	**Y1max** Y1 max	set point float	0	100	100	%
5178	**Q_EA** Source EA fixed value	actual value deletable boolean	--	--	deleted	--
5250	Lead size SG	actual value deletable float	-infinity	+infinity	deleted	--
5251	Slide start SG	set point float	-100	300	22	--
5252	Slide end SG	set point float	-100	300	32	--
5253	EF SG	set point float	-10	10	0,5	--
5324	**Yfix** Y fix	set point float	0	100	100	%
5327	**Q_fix** Q Y fix	actual value deletable boolean	--	--	deleted	--
5328	Manual influence Y1	set point deletable float	0	100	deleted	%
5329	analog BMS influence Y1	set point deletable float	0	100	deleted	%

*	Nr.	Beschreibung
1)	5100	Sollwert
2)	5102	Quelle Regelgröße
3)	5106	Nachstellzeit
4)	5107	alternativer Sollwert
5)	5108	Umschalter für den alternativen Sollwert XS 2
6)	5110	Y-Ausgang
7)	5120	Proportionalbereich
8)	5124	\ Heiz- oder / Kühlsequenz
9)	5129	Aktivierungschalter für die Sequenzumkehr

*	Nr.	Beschreibung
10)	5141	YMin
11)	5145	YMax
12)	5178	Schalter Festwert ein/aus
13)	5250	Führungsgröße der Sollwertgleitung
14)	5251	Gleitanfang der Sollwertgleitung
15)	5252	Gleitende der Sollwertgleitung
16)	5253	Verstärkungsfaktor Sollwertgleitung
17)	5324	vorgebbarer, fester Y-Wert
18)	5327	Schalter für vorgebbaren, festen Y-Wert
19)	5328	Handeinfluß
20)	5329	analoger GLT Einfluß Y1

4.3.2.25. S338 Gliding

Function summary

The function of the DDC software menu S338 gliding is to allow the set point to glide with a command value. The glide range is set by the parameters GLEIT START and GLEIT END.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5421	**Anf** Slide begin	set point float	10	30	22	C
5422	**End** Slide end	set point float	15	40	32	C
5423	**EF** EF slide	set point float	0	5	0,5	--
5424	DELTA slide	actual value float	0	150	0	K
5425	Q Setpoint sliding	set point float	-infinity	+infinity	0	m

4.3.2.26. S342 Pulse output

Function summary

The DDC software object pulse output implements any analog signal 0 .. 100 % as a 3-point signal. It is designed to convert the Y outputs calculated in the PID basic program, heating or fixed value.

The analog signal is set in source parameter 5490 **source Y** 3-point.

The hardware object can be used for 3-point actuators with and without feedback potentiometer. The feedback potentiometer signal is set in 5491 **source return** 3point.

If the value of the Y output is to be increased an OPEN pulse is created.
Parameter 5496 **Pulse OPEN**.
If the Y signal is to be reduced, a CLOSE pulse is created.
Parameter 5497 **Pulse CLOSED**.

The length of the OPEN or CLOSED pulse is calculated from the change in value of the Y output, the motor run times and whilst considering the idle zone.

For a 3-point control without feedback potentiometer in order to calculate the length of the impulse the change in the calculated Y signal **source Y** 3-point is viewed otherwise for control with feedback potentiometer the difference between the Y target position **source Y** 3-point and the current acknowledgement **source return** 3-point.

It is possible to set different motor run times that vary with the direction with 5492 **tMot_Auf** and 5493 **tMot_Zu**.

Independent of a set idle zone above 97 % an ongoing OPEN signal and under 3 % an ongoing CLOSE signal is issued.

Using source parameterizing the 3-point outputs **Pulse OPEN** and **Pulse CLOSED** are to be assigned contact outputs for the DDC4000 system.

Berechnung ohne Rückführpoti

$$tAuf = \frac{tMotAuf \cdot \Delta Y}{100\%}$$

$$tZu = \frac{tMotZu \cdot -\Delta Y}{100\%}$$

Berechnung mit Rückführpoti

$$\text{Auf-Impuls, wenn} \quad \frac{(QuelleY - QuelleRück) \cdot tMotAuf}{100\%} \geq 0{,}4s$$

$$\text{Zu-Impuls, wenn} \quad \frac{(QuelleRück - QuelleY) \cdot tMotZu}{100\%} \geq 0{,}4s$$

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5490	**Q** Source Y 3 position	actual value float	0	100	0	%
5491	**Q R** Source back 3 position	actual value deletable float	0	100	deleted	%
5492	**t Auf** tMot	set point integer	1	2147483647	180	s
5493	**t Zu** tMot_Zu	set point integer	1	2147483647	180	s
5494	**Tot** Dead zone	set point integer	0	50	0	%
5496	**Auf** Impulse OPEN	actual value boolean	--	--	0	--
5497	**Zu** Impulse SHUT	actual value boolean	--	--	0	--

4.3.2.27. S343 E-Max

Function summary

The DDC software menu is used to switch off electrical consumers in a targeted manner. The aim is to keep the average electrical energy consumption of a building or technical plant under a stipulated limiting value. The software menu parameters can be set flexibly and permit the best possible change for each specific problem and plants.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5427	Q alarm reset	set point deletable boolean	--	--	deleted	--
5430	Limiting value high rate	actual value float	0,01	1000000	300	kW
5431	Limiting value low rate	actual value float	0,01	1000000	200	kW
5432	Q Limiting value rate	actual value deletable reference	--	--	deleted	--
5433	Impulse input	actual value deletable reference	--	--	deleted	--
5435	Scaling	actual value float	0	1000	1	--
5436	Scaling exp	actual value integer	-4	4	1	--
5437	Q reset	actual value deletable reference	--	--	deleted	--
5440	Measuring cycle	actual value integer	10	180	60	s
5441	Switch scale factor	actual value integer	1	4	2	--
5442	Wait time	actual value integer	0	5	3	--
5443	Measuring interval	actual value integer	10	60	15	min
5444	Source OFF E max	actual value deletable reference	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
5447	E max status	set point multistate	--	3	0	value,text 0,No GW 1,GW 1 2,GW 2
5448	E max alarm	set point boolean	--	--	0	--
5450	max. nr. of consumers	set point integer	0	20	0	--
5451	act. energy amount Z	set point float	0	10000000	0	kWh
5452	act. power Z	set point float	0	10000000	0	kW
5453	Trend power	set point float	0	10000000	0	kW
5455	P total	set point float	0	999999,875	0	kW
5456	P current	set point float	0	999999,875	0	kW
5457	P from	set point float	0	999999,875	0	kW
5487	P last measuring interval	set point float	0	10000000	0	kW
6641	Max. switched off time 1	actual value integer	5	60	60	min
6642	Max. switched off time 2	actual value integer	5	60	60	min
6643	Max. switched off time 3	actual value integer	5	60	60	min
6644	Max. switched off time 4	actual value integer	5	60	60	min
6645	Max. switched off time 5	actual value integer	5	60	60	min
6646	Max. switched off time 6	actual value integer	5	60	60	min
6647	Max. switched off time 7	actual value integer	5	60	60	min
6648	Max. switched off time 8	actual value integer	5	60	60	min

No.	name of parameter	parameter typ	min	max	init	unit
6649	Max. switched off time 9	actual value integer	5	60	60	min
6650	Max. switched off time 10	actual value integer	5	60	60	min
6651	Max. switched off time 11	actual value integer	5	60	60	min
6652	Max. switched off time 12	actual value integer	5	60	60	min
6653	Max. switched off time 13	actual value integer	5	60	60	min
6654	Max. switched off time 14	actual value integer	5	60	60	min
6655	Max. switched off time 15	actual value integer	5	60	60	min
6656	Max. switched off time 16	actual value integer	5	60	60	min
6657	Max. switched off time 17	actual value integer	5	60	60	min
6658	Max. switched off time 18	actual value integer	5	60	60	min
6659	Max. switched off time 19	actual value integer	5	60	60	min
6660	Max. switched off time 20	actual value integer	5	60	60	min
6701	Back notify contact 1	actual value deletable reference	--	--	deleted	--
6702	Back notify contact 2	actual value deletable reference	--	--	deleted	--
6703	Back notify contact 3	actual value deletable reference	--	--	deleted	--
6704	Back notify contact 4	actual value deletable reference	--	--	deleted	--
6705	Back notify contact 5	actual value deletable reference	--	--	deleted	--
6706	Back notify contact 6	actual value deletable reference	--	--	deleted	--
6707	Back notify contact 7	actual value deletable reference	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
6708	Back notify contact 8	actual value deletable reference	--	--	deleted	--
6709	Back notify contact 9	actual value deletable reference	--	--	deleted	--
6710	Back notify contact 10	actual value deletable reference	--	--	deleted	--
6711	Back notify contact 11	actual value deletable reference	--	--	deleted	--
6712	Back notify contact 12	actual value deletable reference	--	--	deleted	--
6713	Back notify contact 13	actual value deletable reference	--	--	deleted	--
6714	Back notify contact 14	actual value deletable reference	--	--	deleted	--
6715	Back notify contact 15	actual value deletable reference	--	--	deleted	--
6716	Back notify contact 16	actual value deletable reference	--	--	deleted	--
6717	Back notify contact 17	actual value deletable reference	--	--	deleted	--
6718	Back notify contact 18	actual value deletable reference	--	--	deleted	--
6719	Back notify contact 19	actual value deletable reference	--	--	deleted	--
6720	Back notify contact 20	actual value deletable reference	--	--	deleted	--
6721	Min. Switched on time 1	actual value integer	0	60	0	min
6722	Min. Switched on time 2	actual value integer	0	60	0	min
6723	Min. Switched on time 3	actual value integer	0	60	0	min
6724	Min. Switched on time 4	actual value integer	0	60	0	min
6725	Min. Switched on time 5	actual value integer	0	60	0	min
6726	Min. Switched on time 6	actual value integer	0	60	0	min

No.	name of parameter	parameter typ	min	max	init	unit
6727	Min. Switched on time 7	actual value integer	0	60	0	min
6728	Min. Switched on time 8	actual value integer	0	60	0	min
6729	Min. Switched on time 9	actual value integer	0	60	0	min
6730	Min. Switched on time 10	actual value integer	0	60	0	min
6731	Min. Switched on time 11	actual value integer	0	60	0	min
6732	Min. Switched on time 12	actual value integer	0	60	0	min
6733	Min. Switched on time 13	actual value integer	0	60	0	min
6734	Min. Switched on time 14	actual value integer	0	60	0	min
6735	Min. Switched on time 15	actual value integer	0	60	0	min
6736	Min. Switched on time 16	actual value integer	0	60	0	min
6737	Min. Switched on time 17	actual value integer	0	60	0	min
6738	Min. Switched on time 18	actual value integer	0	60	0	min
6739	Min. Switched on time 19	actual value integer	0	60	0	min
6740	Min. Switched on time 20	actual value integer	0	60	0	min
6741	Min. Switched off time 1	actual value integer	0	60	0	min
6742	Min. Switched off time 2	actual value integer	0	60	0	min
6743	Min. Switched off time 3	actual value integer	0	60	0	min
6744	Min. Switched off time 4	actual value integer	0	60	0	min
6745	Min. Switched off time 5	actual value integer	0	60	0	min

No.	name of parameter	parameter typ	min	max	init	unit
6746	Min. Switched off time 6	actual value integer	0	60	0	min
6747	Min. Switched off time 7	actual value integer	0	60	0	min
6748	Min. Switched off time 8	actual value integer	0	60	0	min
6749	Min. Switched off time 9	actual value integer	0	60	0	min
6750	Min. Switched off time 10	actual value integer	0	60	0	min
6751	Min. Switched off time 11	actual value integer	0	60	0	min
6752	Min. Switched off time 12	actual value integer	0	60	0	min
6753	Min. Switched off time 13	actual value integer	0	60	0	min
6754	Min. Switched off time 14	actual value integer	0	60	0	min
6755	Min. Switched off time 15	actual value integer	0	60	0	min
6756	Min. Switched off time 16	actual value integer	0	60	0	min
6757	Min. Switched off time 17	actual value integer	0	60	0	min
6758	Min. Switched off time 18	actual value integer	0	60	0	min
6759	Min. Switched off time 19	actual value integer	0	60	0	min
6760	Min. Switched off time 20	actual value integer	0	60	0	min
6761	Power consumption 1	actual value deletable float	0,1	10000000	deleted	kW
6762	Power consumption 2	actual value deletable float	0,1	10000000	deleted	kW
6763	Power consumption 3	actual value deletable float	0,1	10000000	deleted	kW
6764	Power consumption 4	actual value deletable float	0,1	10000000	deleted	kW

No.	name of parameter	parameter typ	min	max	init	unit
6765	Power consumption 5	actual value deletable float	0,1	10000000	deleted	kW
6766	Power consumption 6	actual value deletable float	0,1	10000000	deleted	kW
6767	Power consumption 7	actual value deletable float	0,1	10000000	deleted	kW
6768	Power consumption 8	actual value deletable float	0,1	10000000	deleted	kW
6769	Power consumption 9	actual value deletable float	0,1	10000000	deleted	kW
6770	Power consumption 10	actual value deletable float	0,1	10000000	deleted	kW
6771	Power consumption 11	actual value deletable float	0,1	10000000	deleted	kW
6772	Power consumption 12	actual value deletable float	0,1	10000000	deleted	kW
6773	Power consumption 12	actual value deletable float	0,1	10000000	deleted	kW
6774	Power consumption 14	actual value deletable float	0,1	10000000	deleted	kW
6775	Power consumption 15	actual value deletable float	0,1	10000000	deleted	kW
6776	Power consumption 16	actual value deletable float	0,1	10000000	deleted	kW
6777	Power consumption 17	actual value deletable float	0,1	10000000	deleted	kW
6778	Power consumption 18	actual value deletable float	0,1	10000000	deleted	kW
6779	Power consumption 19	actual value deletable float	0,1	10000000	deleted	kW
6780	Power consumption 20	actual value deletable float	0,1	10000000	deleted	kW
6781	Priority 1	actual value integer	1	3	1	--
6782	Priority 2	actual value integer	1	3	1	--
6783	Priority 3	actual value integer	1	3	1	--

No.	name of parameter	parameter typ	min	max	init	unit
6784	Priority 4	actual value integer	1	3	1	--
6785	Priority 5	actual value integer	1	3	1	--
6786	Priority 6	actual value integer	1	3	1	--
6787	Priority 7	actual value integer	1	3	1	--
6788	Priority 8	actual value integer	1	3	1	--
6789	Priority 9	actual value integer	1	3	1	--
6790	Priority 10	actual value integer	1	3	1	--
6791	Priority 11	actual value integer	1	3	1	--
6792	Priority 12	actual value integer	1	3	1	--
6793	Priority 13	actual value integer	1	3	1	--
6794	Priority 14	actual value integer	1	3	1	--
6795	Priority 15	actual value integer	1	3	1	--
6796	Priority 16	actual value integer	1	3	1	--
6797	Priority 17	actual value integer	1	3	1	--
6798	Priority 18	actual value integer	1	3	1	--
6799	Priority 19	actual value integer	1	3	1	--
6800	Priority 20	actual value integer	1	3	1	--
6801	Source Manual 1	actual value deletable reference	--	--	deleted	--
6802	Source Manual 2	actual value deletable reference	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
6803	Source Manual 3	actual value deletable reference	--	--	deleted	--
6804	Source Manual 4	actual value deletable reference	--	--	deleted	--
6805	Source Manual 5	actual value deletable reference	--	--	deleted	--
6806	Source Manual 6	actual value deletable reference	--	--	deleted	--
6807	Source Manual 7	actual value deletable reference	--	--	deleted	--
6808	Source Manual 8	actual value deletable reference	--	--	deleted	--
6809	Source Manual 9	actual value deletable reference	--	--	deleted	--
6810	Source Manual 10	actual value deletable reference	--	--	deleted	--
6811	Source Manual 11	actual value deletable reference	--	--	deleted	--
6812	Source Manual 12	actual value deletable reference	--	--	deleted	--
6813	Source Manual 13	actual value deletable reference	--	--	deleted	--
6814	Source Manual 14	actual value deletable reference	--	--	deleted	--
6815	Source Manual 15	actual value deletable reference	--	--	deleted	--
6816	Source Manual 16	actual value deletable reference	--	--	deleted	--
6817	Source Manual 17	actual value deletable reference	--	--	deleted	--
6818	Source Manual 18	actual value deletable reference	--	--	deleted	--
6819	Source Manual 19	actual value deletable reference	--	--	deleted	--
6820	Source Manual 20	actual value deletable reference	--	--	deleted	--
6821	Consumers 1	set point boolean	--	--	1	--

No.	name of parameter	parameter typ	min	max	init	unit
6822	Consumers 2	set point boolean	--	--	1	--
6823	Consumers 3	set point boolean	--	--	1	--
6824	Consumers 4	set point boolean	--	--	1	--
6825	Consumers 5	set point boolean	--	--	1	--
6826	Consumers 6	set point boolean	--	--	1	--
6827	Consumers 7	set point boolean	--	--	1	--
6828	Consumers 8	set point boolean	--	--	1	--
6829	Consumers 9	set point boolean	--	--	1	--
6830	Consumers 10	set point boolean	--	--	1	--
6831	Consumers 11	set point boolean	--	--	1	--
6832	Consumers 12	set point boolean	--	--	1	--
6833	Consumers 13	set point boolean	--	--	1	--
6834	Consumers 14	set point boolean	--	--	1	--
6835	Consumers 15	set point boolean	--	--	1	--
6836	Consumers 16	set point boolean	--	--	1	--
6837	Consumers 17	set point boolean	--	--	1	--
6838	Consumers 18	set point boolean	--	--	1	--
6839	Consumers 19	set point boolean	--	--	1	--
6840	Consumers 20	set point boolean	--	--	1	--

4.3.2.28. S344 Degree daily figure

Function summary

The degree day figure represents a relationship between the outside temperature and energy consumption and therefore gives information on the heat consumption and heating costs for a heating period. It is the product of the number of heating days and the difference between the usual room temperature of 20 °C and the outside temperature. Heating days are when it is colder than 5155 basic heating day (15…20°C).

At Kieback&Peter a heating day is assumed when the average daily temperature is under 20 °C. The varies may differ for export.

The degree day number is calculated retroactively for the past day as follows:

TO average < **Basic heating day** at 24:00 Þ GTZnew = GTZold + (20 – TO average)
TO average >=**Basic** H**eating day** at 24:00 Þ GTZnew = GTZold

TO average is the arithmetic average of the outside temperature read each minute.
TOaverage = å AT / number of full operating minutes the previous day.

For the first calculation of the degree day number 5154 **degree day number** the software object must be active for two days.

The calculation is only made if the parameter for the outside temperature 5103 **source TO** had a valid value on the previous day for at least 18 hours.

The degree day number 5154 **degree day number** can be preset to a whole number >=. At the end of the month or year the degree day number is not reset automatically. If required this must be done e. g. via the control panel.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5103	Source TA	actual value deletable float	-infinity	+infinity	deleted	C
5154	Degree-day nr.	set point integer	0	99999999	0	--
5155	Basic heating	set point integer	15	20	20	C

4.3.2.29. S347 E-Max French

Function summary

The DDC software menu is used to switch off electrical consumers in a targeted manner. The aim is to keep the average electrical energy consumption of a building or technical plant under a stipulated limiting value. The software menu parameters can be set flexibly and permit the best possible change for each specific problem and plants.

Note: software object S347 is especially set up to meet the requests of the French power industry.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
5429	Limiting value tanphi	actual value float	0	1	0,4	--
5434	**Q res** Q reset	actual value deletable reference	--	--	deleted	--
5438	Measuring cycle	actual value integer	10	180	60	s
5439	Switch scale factor	actual value integer	1	4	2	--
5445	Measuring interval	actual value integer	10	30	10	min
5446	E max status	set point multistate	--	8	0	value,text 0,No GW 1,GW 1 2,GW 2 3,GW 3 4,GW 4 5,GW 5 6,GW 6 7,GW 7
5449	E max alarm tanphi	set point boolean	--	--	0	--
5454	Wait time	actual value integer	0	5	3	--
5458	**Q Aus** Source OFF E max	actual value deletable reference	--	--	deleted	--
5459	E max alarm	set point boolean	--	--	0	--
5460	Max. nr. of consumers	set point integer	0	20	0	--

No.	name of parameter	parameter typ	min	max	init	unit
5461	Limiting value partial load summer	actual value float	0,01	1000000	300	kW
5462	Limiting value full load summer	actual value float	0,01	1000000	300	kW
5463	Limiting value partial load winter	actual value float	0,01	1000000	300	kW
5464	Limiting value normal load winter	actual value float	0,01	1000000	300	kW
5465	Limiting value full load winter	actual value float	0,01	1000000	300	kW
5466	Limiting value peak load winter	actual value float	0,01	1000000	300	kW
5467	Limiting value EJP	actual value float	0,01	1000000	300	kW
5468	act. energy amount Z	set point float	0	10000000	0	kWh
5469	act. power Z	set point float	0	10000000	0	kW
5470	Trend power	set point float	0	10000000	0	kW
5471	Q P	actual value deletable reference	--	--	deleted	--
5472	Q HC	actual value deletable reference	--	--	deleted	--
5473	Q EJP	actual value deletable reference	--	--	deleted	--
5474	Q EJP notification 30 min	actual value deletable reference	--	--	deleted	--
5475	Q EJP notification 24 h	actual value deletable reference	--	--	deleted	--
5476	Q even month	actual value deletable reference	--	--	deleted	--
5477	P total	set point float	0	999999,875	0	kW
5478	P current	set point float	0	999999,875	0	kW
5479	P from	set point float	0	999999,875	0	kW

No.	name of parameter	parameter typ	min	max	init	unit
5480	P last measuring interval	set point float	0	10000000	0	kW
5481	Impuls input eff. power	actual value deletable reference	--	--	deleted	--
5482	Scaling eff. power	actual value float	0	1000	1	--
5483	Scaling exp eff. power	actual value integer	-4	4	1	--
5484	Impuls input blind power	actual value deletable reference	--	--	deleted	--
5485	Scaling blind power	actual value float	0	1000	1	--
5486	Scaling exp blind power	actual value integer	-4	4	1	--
6661	Source Manual 1	actual value deletable reference	--	--	deleted	--
6662	Source Manual 2	actual value deletable reference	--	--	deleted	--
6663	Source Manual 3	actual value deletable reference	--	--	deleted	--
6664	Source Manual 4	actual value deletable reference	--	--	deleted	--
6665	Source Manual 5	actual value deletable reference	--	--	deleted	--
6666	Source Manual 6	actual value deletable reference	--	--	deleted	--
6667	Source Manual 7	actual value deletable reference	--	--	deleted	--
6668	Source Manual 8	actual value deletable reference	--	--	deleted	--
6669	Source Manual 9	actual value deletable reference	--	--	deleted	--
6670	Source Manual 10	actual value deletable reference	--	--	deleted	--
6671	Source Manual 11	actual value deletable reference	--	--	deleted	--
6672	Source Manual 12	actual value deletable reference	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
6673	Source Manual 13	actual value deletable reference	--	--	deleted	--
6674	Source Manual 14	actual value deletable reference	--	--	deleted	--
6675	Source Manual 15	actual value deletable reference	--	--	deleted	--
6676	Source Manual 16	actual value deletable reference	--	--	deleted	--
6677	Source Manual 17	actual value deletable reference	--	--	deleted	--
6678	Source Manual 18	actual value deletable reference	--	--	deleted	--
6679	Source Manual 19	actual value deletable reference	--	--	deleted	--
6680	Source Manual 20	actual value deletable reference	--	--	deleted	--
6681	Consumers 1	set point boolean	--	--	1	--
6682	Consumers 2	set point boolean	--	--	1	--
6683	Consumers 3	set point boolean	--	--	1	--
6684	Consumers 4	set point boolean	--	--	1	--
6685	Consumers 5	set point boolean	--	--	1	--
6686	Consumers 6	set point boolean	--	--	1	--
6687	Consumers 7	set point boolean	--	--	1	--
6688	Consumers 8	set point boolean	--	--	1	--
6689	Consumers 9	set point boolean	--	--	1	--
6690	Consumers 10	set point boolean	--	--	1	--
6691	Consumers 11	set point boolean	--	--	1	--

No.	name of parameter	parameter typ	min	max	init	unit
6692	Consumers 12	set point boolean	--	--	1	--
6693	Consumers 13	set point boolean	--	--	1	--
6694	Consumers 14	set point boolean	--	--	1	--
6695	Consumers 15	set point boolean	--	--	1	--
6696	Consumers 16	set point boolean	--	--	1	--
6697	Consumers 17	set point boolean	--	--	1	--
6698	Consumers 18	set point boolean	--	--	1	--
6699	Consumers 19	set point boolean	--	--	1	--
6700	Consumers 20	set point boolean	--	--	1	--
6841	EJP 1	actual value boolean	--	--	1	--
6842	EJP 2	actual value boolean	--	--	1	--
6843	EJP 3	actual value boolean	--	--	1	--
6844	EJP 4	actual value boolean	--	--	1	--
6845	EJP 5	actual value boolean	--	--	1	--
6846	EJP 6	actual value boolean	--	--	1	--
6847	EJP 7	actual value boolean	--	--	1	--
6848	EJP 8	actual value boolean	--	--	1	--
6849	EJP 9	actual value boolean	--	--	1	--
6850	EJP 10	actual value boolean	--	--	1	--

No.	name of parameter	parameter typ	min	max	init	unit
6851	EJP 11	actual value boolean	--	--	1	--
6852	EJP 12	actual value boolean	--	--	1	--
6853	EJP 13	actual value boolean	--	--	1	--
6854	EJP 14	actual value boolean	--	--	1	--
6855	EJP 15	actual value boolean	--	--	1	--
6856	EJP 16	actual value boolean	--	--	1	--
6857	EJP 17	actual value boolean	--	--	1	--
6858	EJP 18	actual value boolean	--	--	1	--
6859	EJP 19	actual value boolean	--	--	1	--
6860	EJP 20	actual value boolean	--	--	1	--
6861	Max. switched off time 1	actual value integer	5	60	60	min
6862	Max. switched off time 2	actual value integer	5	60	60	min
6863	Max. switched off time 3	actual value integer	5	60	60	min
6864	Max. switched off time 4	actual value integer	5	60	60	min
6865	Max. switched off time 5	actual value integer	5	60	60	min
6866	Max. switched off time 6	actual value integer	5	60	60	min
6867	Max. switched off time 7	actual value integer	5	60	60	min
6868	Max. switched off time 8	actual value integer	5	60	60	min
6869	Max. switched off time 9	actual value integer	5	60	60	min

No.	name of parameter	parameter typ	min	max	init	unit
6870	Max. switched off time 10	actual value integer	5	60	60	min
6871	Max. switched off time 11	actual value integer	5	60	60	min
6872	Max. switched off time 12	actual value integer	5	60	60	min
6873	Max. switched off time 13	actual value integer	5	60	60	min
6874	Max. switched off time 14	actual value integer	5	60	60	min
6875	Max. switched off time 15	actual value integer	5	60	60	min
6876	Max. switched off time 16	actual value integer	5	60	60	min
6877	Max. switched off time 17	actual value integer	5	60	60	min
6878	Max. switched off time 18	actual value integer	5	60	60	min
6879	Max. switched off time 19	actual value integer	5	60	60	min
6880	Max. switched off time 20	actual value integer	5	60	60	min
6881	Back notify contact 1	actual value deletable reference	--	--	deleted	--
6882	Back notify contact 2	actual value deletable reference	--	--	deleted	--
6883	Back notify contact 3	actual value deletable reference	--	--	deleted	--
6884	Back notify contact 4	actual value deletable reference	--	--	deleted	--
6885	Back notify contact 5	actual value deletable reference	--	--	deleted	--
6886	Back notify contact 6	actual value deletable reference	--	--	deleted	--
6887	Back notify contact 7	actual value deletable reference	--	--	deleted	--
6888	Back notify contact 8	actual value deletable reference	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
6889	Back notify contact 9	actual value deletable reference	--	--	deleted	--
6890	Back notify contact 10	actual value deletable reference	--	--	deleted	--
6891	Back notify contact 11	actual value deletable reference	--	--	deleted	--
6892	Back notify contact 12	actual value deletable reference	--	--	deleted	--
6893	Back notify contact 13	actual value deletable reference	--	--	deleted	--
6894	Back notify contact 14	actual value deletable reference	--	--	deleted	--
6895	Back notify contact 15	actual value deletable reference	--	--	deleted	--
6896	Back notify contact 16	actual value deletable reference	--	--	deleted	--
6897	Back notify contact 17	actual value deletable reference	--	--	deleted	--
6898	Back notify contact 18	actual value deletable reference	--	--	deleted	--
6899	Back notify contact 19	actual value deletable reference	--	--	deleted	--
6900	Back notify contact 20	actual value deletable reference	--	--	deleted	--
6901	Min. Switched on time 1	actual value integer	0	60	0	min
6902	Min. Switched on time 2	actual value integer	0	60	0	min
6903	Min. Switched on time 3	actual value integer	0	60	0	min
6904	Min. Switched on time 4	actual value integer	0	60	0	min
6905	Min. Switched on time 5	actual value integer	0	60	0	min
6906	Min. Switched on time 6	actual value integer	0	60	0	min
6907	Min. Switched on time 7	actual value integer	0	60	0	min

No.	name of parameter	parameter typ	min	max	init	unit
6908	Min. Switched on time 8	actual value integer	0	60	0	min
6909	Min. Switched on time 9	actual value integer	0	60	0	min
6910	Min. Switched on time 10	actual value integer	0	60	0	min
6911	Min. Switched on time 11	actual value integer	0	60	0	min
6912	Min. Switched on time 12	actual value integer	0	60	0	min
6913	Min. Switched on time 13	actual value integer	0	60	0	min
6914	Min. Switched on time 14	actual value integer	0	60	0	min
6915	Min. Switched on time 15	actual value integer	0	60	0	min
6916	Min. Switched on time 16	actual value integer	0	60	0	min
6917	Min. Switched on time 17	actual value integer	0	60	0	min
6918	Min. Switched on time 18	actual value integer	0	60	0	min
6919	Min. Switched on time 19	actual value integer	0	60	0	min
6920	Min. Switched on time 20	actual value integer	0	60	0	min
6921	Min. Switched off time 1	actual value integer	0	60	0	min
6922	Min. Switched off time 2	actual value integer	0	60	0	min
6923	Min. Switched off time 3	actual value integer	0	60	0	min
6924	Min. Switched off time 4	actual value integer	0	60	0	min
6925	Min. Switched off time 5	actual value integer	0	60	0	min
6926	Min. Switched off time 6	actual value integer	0	60	0	min

No.	name of parameter	parameter typ	min	max	init	unit
6927	Min. Switched off time 7	actual value integer	0	60	0	min
6928	Min. Switched off time 8	actual value integer	0	60	0	min
6929	Min. Switched off time 9	actual value integer	0	60	0	min
6930	Min. Switched off time 10	actual value integer	0	60	0	min
6931	Min. Switched off time 11	actual value integer	0	60	0	min
6932	Min. Switched off time 12	actual value integer	0	60	0	min
6933	Min. Switched off time 13	actual value integer	0	60	0	min
6934	Min. Switched off time 14	actual value integer	0	60	0	min
6935	Min. Switched off time 15	actual value integer	0	60	0	min
6936	Min. Switched off time 16	actual value integer	0	60	0	min
6937	Min. Switched off time 17	actual value integer	0	60	0	min
6938	Min. Switched off time 18	actual value integer	0	60	0	min
6939	Min. Switched off time 19	actual value integer	0	60	0	min
6940	Min. Switched off time 20	actual value integer	0	60	0	min
6941	Power consumption 1	actual value deletable float	0,1	10000000	deleted	kW
6942	Power consumption 2	actual value deletable float	0,1	10000000	deleted	kW
6943	Power consumption 3	actual value deletable float	0,1	10000000	deleted	kW
6944	Power consumption 4	actual value deletable float	0,1	10000000	deleted	kW
6945	Power consumption 5	actual value deletable float	0,1	10000000	deleted	kW

No.	name of parameter	parameter typ	min	max	init	unit
6946	Power consumption 6	actual value deletable float	0,1	10000000	deleted	kW
6947	Power consumption 7	actual value deletable float	0,1	10000000	deleted	kW
6948	Power consumption 8	actual value deletable float	0,1	10000000	deleted	kW
6949	Power consumption 9	actual value deletable float	0,1	10000000	deleted	kW
6950	Power consumption 10	actual value deletable float	0,1	10000000	deleted	kW
6951	Power consumption 11	actual value deletable float	0,1	10000000	deleted	kW
6952	Power consumption 12	actual value deletable float	0,1	10000000	deleted	kW
6953	Power consumption 13	actual value deletable float	0,1	10000000	deleted	kW
6954	Power consumption 14	actual value deletable float	0,1	10000000	deleted	kW
6955	Power consumption 15	actual value deletable float	0,1	10000000	deleted	kW
6956	Power consumption 16	actual value deletable float	0,1	10000000	deleted	kW
6957	Power consumption 17	actual value deletable float	0,1	10000000	deleted	kW
6958	Power consumption 18	actual value deletable float	0,1	10000000	deleted	kW
6959	Power consumption 19	actual value deletable float	0,1	10000000	deleted	kW
6960	Power consumption 20	actual value deletable float	0,1	10000000	deleted	kW
6961	Priority 1	actual value integer	1	3	1	--
6962	Priority 2	actual value integer	1	3	1	--
6963	Priority 3	actual value integer	1	3	1	--
6964	Priority 4	actual value integer	1	3	1	--

No.	name of parameter	parameter typ	min	max	init	unit
6965	Priority 5	actual value integer	1	3	1	--
6966	Priority 6	actual value integer	1	3	1	--
6967	Priority 7	actual value integer	1	3	1	--
6968	Priority 8	actual value integer	1	3	1	--
6969	Priority 9	actual value integer	1	3	1	--
6970	Priority 10	actual value integer	1	3	1	--
6971	Priority 11	actual value integer	1	3	1	--
6972	Priority 12	actual value integer	1	3	1	--
6973	Priority 13	actual value integer	1	3	1	--
6974	Priority 14	actual value integer	1	3	1	--
6975	Priority 15	actual value integer	1	3	1	--
6976	Priority 16	actual value integer	1	3	1	--
6977	Priority 17	actual value integer	1	3	1	--
6978	Priority 18	actual value integer	1	3	1	--
6979	Priority 19	actual value integer	1	3	1	--
6980	Priority 20	actual value integer	1	3	1	--

4.3.2.30. S901 Signal generator

Function summary

Signal generator for test purposes.

Produces a
- sinus signal
- Ramp / sawtooth signal
- Rectangular signal

with selectable
- period duration
- Amplitude
- Amplitude offset

The cycle time of the signal generator is 50ms. All three different signal generators have a reset input that restarts the production of the output signal.

Functions / restrictions:
- Sinus generator:
  minimum period duration > 10* cycle time
- Ramp / sawtooth signal:
  t1: Time for increasing ramp >= cycle time
  t2: Time for falling ramp, >= cycle time, connected to t1
  t1+t2 must be <= period time
  if t1+t2 < period time the signal looks like this: /_/_
- Rectangular generator:
  tPulse: "On" pulse time must be > cycle time and < period time.

Parameters

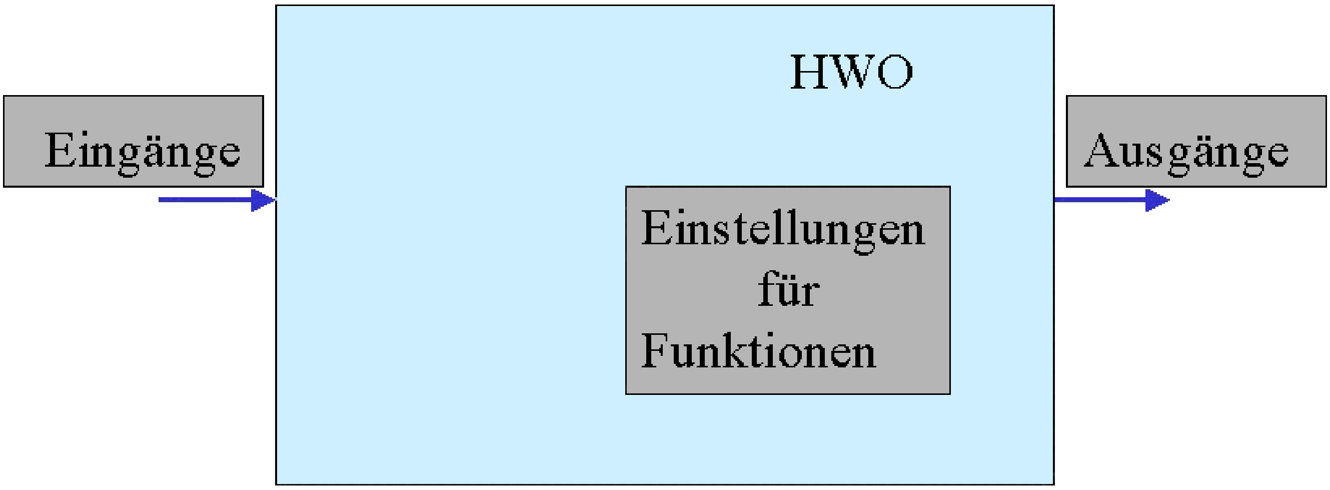
No.	name of parameter	parameter typ	min	max	init	unit
1	**tPer_sin** T_Periode_Sinus	set point float	1	+infinity	10	s
2	Half_Ampl_sin	set point float	0	+infinity	1	--
3	Offs_sin	set point float	-infinity	+infinity	0	--
4	**Res Sin** Reset_sin	set point boolean	--	--	0	--
5	tPer_ramp	set point float	1	+infinity	10	s
6	t1_ramp	set point float	0,1	+infinity	9,9	s
7	t2_ramp	set point float	0,1	+infinity	0,1	s

No.	name of parameter	parameter typ	min	max	init	unit
8	Ampl_ramp	set point float	0	+infinity	1	--
9	Offs_ramp	set point float	-infinity	+infinity	0	--
10	**res ramp** Reset_ramp	set point boolean	--	--	0	--
11	tPer_pulse	set point float	0,1	+infinity	1	s
12	tPulse_pulse	set point float	0,05	+infinity	0,5	s
13	Ampl_pulse	set point float	0	+infinity	1	--
14	Offs_pulse	set point float	-infinity	+infinity	0	--
15	Reset_pulse	set point boolean	--	--	0	--
16	**sin** sine	actual value float	-infinity	+infinity	0	--
17	**rampe** ramp	actual value float	-infinity	+infinity	0	--
18	**Impuls** pulse	actual value float	-infinity	+infinity	0	--
19	**tcyc** Cycle time	actual value float	0,01	3600	1	s

4.3.3. Hardware objects

4.3.3.1. What are hardware objects?

Hardware objects are summaries of control functions in a block with input and output factors. The markers and timers are summarized to unchangeable and tested blocks.



Hardware objects are comprised of the specific function to controlling a machine and repeated functions.

The repeated functions include for example:

Operating hours counter with limiting value
Command execution check (CEC)
malfunction catch

For this these functions must not be used. Functions requested by the customer are however integrated in a HWO.

The hardware objects are structured such that they are very similar in terms of options for influencing the setting signals, priorities and function groups.

The hardware objects receive their input signals from the control, from hardware inputs or the DDC control (markers, timer). With the aid of the DDC market and time missing functions on these HWOs can be set. For example fire protection covers can be collected in order for them to be linked into once cover with a release.

The HWO outputs are designed for coupling (via supports) with the hardware outputs.

In order to avoid run time differences for the switching signals the contacts for one device, e.g. fan, must be on an output module. Otherwise the steps or on and off signals may take place at the same time.

Parameters, names and classification

Parameters can be addressed in two different ways.
1. via the parameter number and 2. via the parameter name.
The parameter number is unique to only one object. Each object can have for example a parameter with the number 12 and the text "Rep". For this addressing is possible in sources and links both via voice-led parameters and via parameter names. The use of texts instead of numbers is advantageous for planning plant assignments and when reading sources.

A customer-specific plain text can still be set for the relevant parameter.

There are different types of parameters:

- Binary values (Boolean): Logical value (0 or 1)
- Integer: Number without places after decimal point (-2,147,483,648 to +2,147,483,647)
- Floating comma: Number with digits after the decimal point (-3.402823466E38 to 3.402823466E38)
- Multistate: Value has one of several statuses (0-OFF, 1-ON, 9-AUTO). For this "BACnet" in the parameter table means the BACnet number of the status and "DDC No." means the DDC4000 number.
- Selection list: Value that can have one of a choice of statuses. Each status is one bit position.

4.3.3.2. All hardware objects

object no.	name of object	release stage: 24.07.2006
H000S	Sim	unreleased
H001	Circul. pump	0.3.33
H002	Pump	0.3.33
H004	Device on the M-Bus	0.2.1
H010	Network-Var.	unreleased
H045	Control channel	unreleased
H101	Sensor general	unreleased
H102	Sensor pressure	unreleased
H103	Sensor humidity	unreleased
H104	Sensor CO2	unreleased
H105	Sensor temperature	unreleased
H106	Sensor volume current	unreleased
H201	Detector general	unreleased
H202	Detector diff pressure ventilator	unreleased
H203	Detector frost protection	unreleased
H204	Detector STB/TR	unreleased
H301	Steam humidifier cont.	0.1.9
H302	Steam humidif. constant	unreleased
H401	One-level electro heater	0.1.9
H402	Two-level electro heater	0.1.9
H403	Three-level electro heater	0.1.9
H404	Electroheater contin.	0.1.9
H501	Flap OPEN/SHUT	0.1.9
H502	Fire protection flap	0.1.9
H503	Flap 3-Point	0.1.9
H504	Flap continuous	0.1.9
H601	1-level fan	0.1.9
H602	2-level fan	0.1.9

object no.	name of object	release stage: 24.07.2006
H603	3-level fan	unreleased
H604	Fan FU/Byp	0.1.9
H611	Valve OPEN/SHUT	0.1.9
H612	Valve BUS	unreleased
H613	3-point valve	0.1.9
H614	Valve cont.	0.1.9
H701	One-level burner	0.1.9
H702	Two-level burner	0.1.9
H703	Burner modulat. 3-point	0.1.9
H704	Burner cont. modulating	0.1.9
H801	Volume current controller const	0.1.9
H802	Volume current controller cont.	0.1.9
H901	One level pump	0.1.9
H903	Pump FU/Bypass	0.1.9
H904	Pump BUS	unreleased
H905	Double pump	0.1.9

4.3.3.3. Priorities and signals

Priorities auto, Z, DOL, manual, forced and malfunction

There are various options for influencing the setting signals.

Setting signals are changed in the various hardware objects be the following intervention variable:

Priority	Parameter / Value	Action
Highest	**SM**	Described in the relevant "trouble-shooting" section, usually switch off outputs
	Rep, Zw/Off, Manual/Off	Switch off outputs
	Manual/open, Zw/open	Switch on outputs
	Z/closed, DOL	Switch off outputs
	Z/On	Switch on outputs
lowest	**Auto**	Automatic operation

SM	Malfunction message from the field
Rep	Repair switch - influences a block released on the device for repair work
Zw	Forced influence - intervention through regulating or control events, e.g. to integrate superordinate malfunction messages such as frost guards (forced on, forced off or forced values)
Manual	Manual influence - Intervention through operation on / near the DDC (manual on, manual off, manual automatic etc) or manual values
Z	Z influence - intervention by switching on building technology (Z on, Z off)
Auto	Automatic operation, if nec. by influencing time programs
DOL	Direct operating level - intervention through direct operation (e.g. front switch modules)

Most of the abbreviations above and following are refering to German expressions therefore they are not reasonable for English understanding.

4.3.3.4. Command execution check CEC

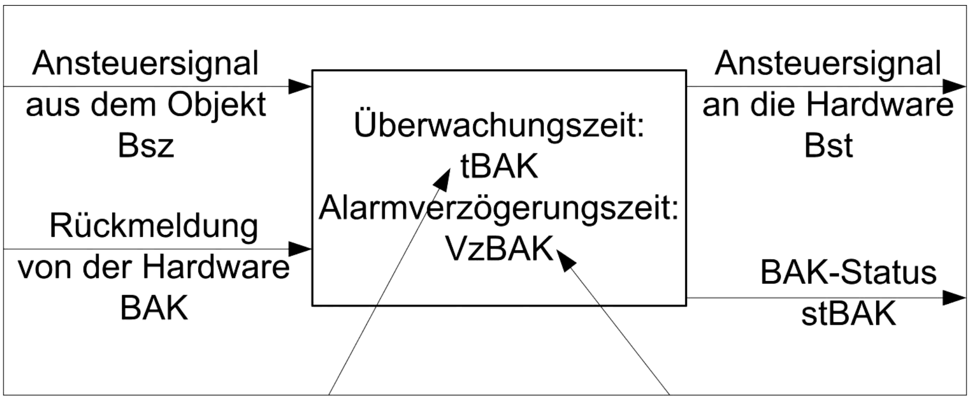
Command execution check

The command execution control is used to monitor binary operating actual statuses.
An actual operation status (or operating message) must with a specific period of time **tCEC** match the value of a target operating status, otherwise the binary output **stCEC** is set to 1. If the actual operating status is not switched no **stCEC** is signaled.
The **stCEC** is reset when the **ResSM** input changes from 0 to 1.
If the **ResCEC** input is not switched **stCEC** is reset when the actual operating status matches the target operating status again.
The 0/1 flank from **stCEC** is out put with a **VzCEC** delay.

The monitored signal is withdrawn for malfunction recognition after the time tCEC + VzCEC.

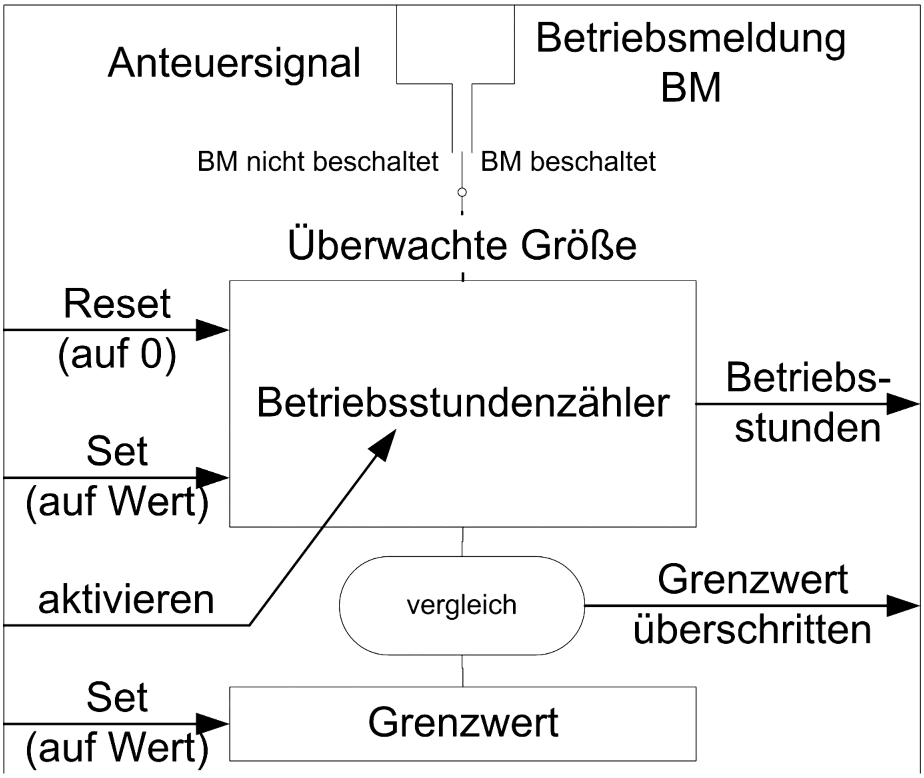
Par.No	Parameter name, plain text	Description	Input	Ed.
	Bsz	Input target operational status	x	
	CEC	Input for the binary actual status	x	
	tCEC	Time within which the actual operating status may differ from the target operating status without releasing **stCEC**	x	
	VzCEC	**stCEC** is output with a delay for the stated time.	x	
	ResCEC	Resets the **stCEC**.	x	
	stCEC	Signals that the actual operating status was longer than the **tCEC** of the target operating status.		x

Signal interaction depiction



4.3.3.5. Operating hours

Operation hours counting with and without limiting value



The command execution control is used to measure the duration of binary actual operating statuses.
The counting can be reset to 0, set by default or changed.
Exceeding an operating hour limiting value is signaled in parameter
gBh "limiting value infringement".

Par.No	Parameter name, plain text	Description	Input	Ed.
	BhZ	Input for the binary actual status	x	
	BhGw	Operating hours limiting value	x	
	ResBh	Resets **Bh** to 0	x	
	Bh	Time in which **BhZ** was 1	x	x
	gBh	Limit value infringement		x

4.3.3.6. Malfunction catch

A set malfunction message signal prevents the occurrence of a new malfunction message.

A malfunction that occurs SM may influence the control of output Y
a) not ("malfunction blocked" = 0)
b) sets the Y output to 0% or for binary outputs to 0 and if nec. Anf to 0 ("malfunction blocked" = 1)

The malfunction message can be reset with "ResSM".

An important note:
How does "malfunction blocked" work?

The "malfunction blocked" parameter can be set to yes or no. If a malfunction occurs either the output is switched off or the malfunction does not affect the outputs.

The **malfunction catch** is activated by linking a source on ResSM (Reset malfunction message). Only in this case is it possible to reset a malfunction message. Here a link creates a function.

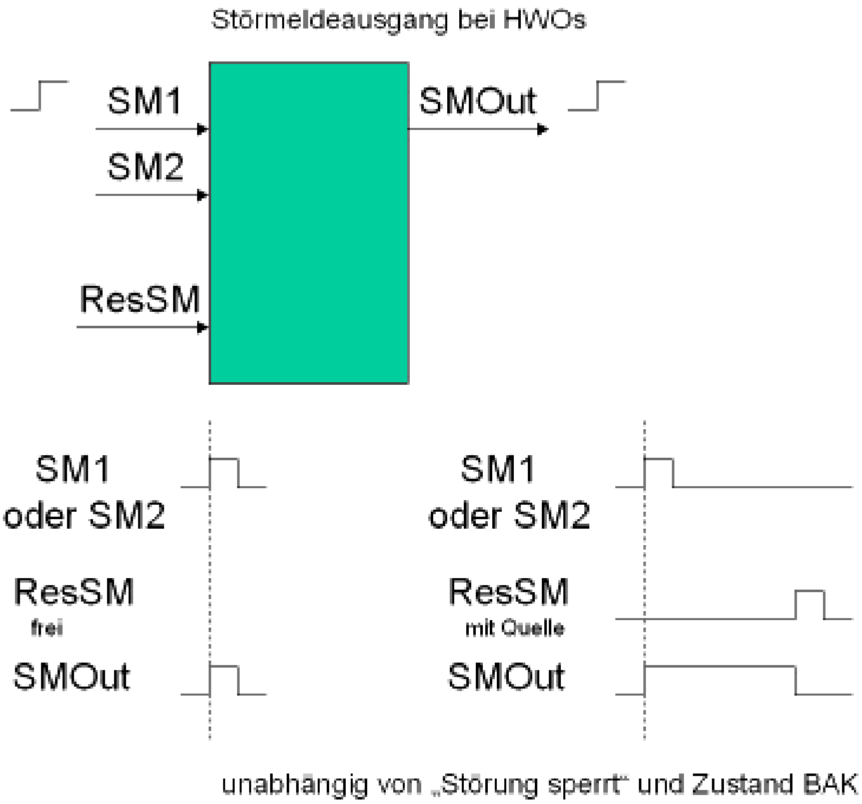
Parameters

Parameter name, plain text	Description	Input	Ed.
Reset	is controlled by level indicator		

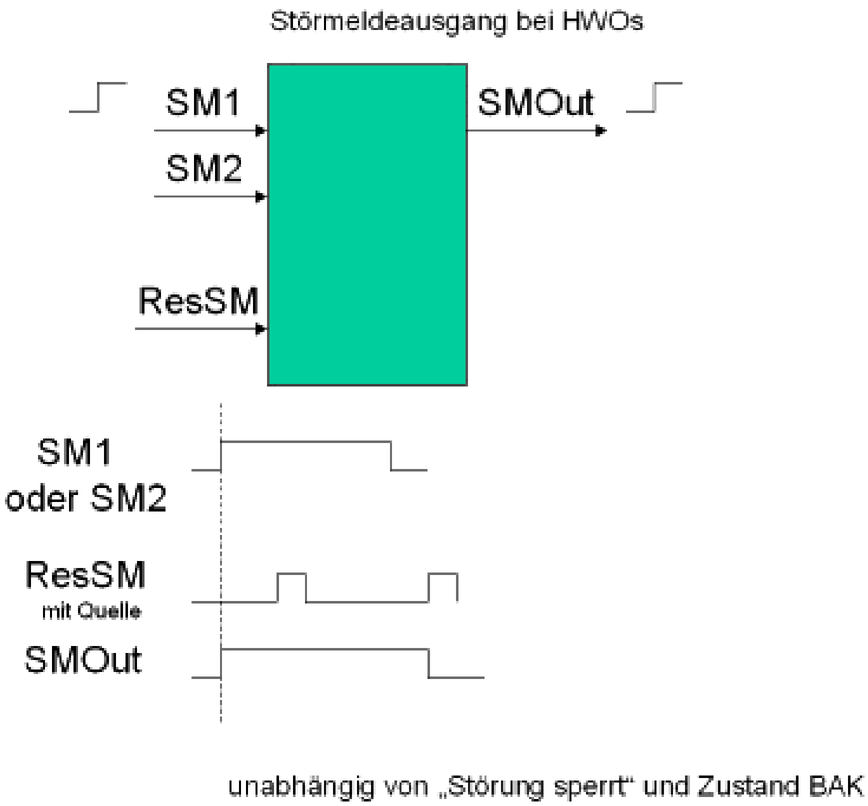
4.3.3.7. Malfunction message output

Malfunction message output /SMout

Almost all hardware objects have a malfunction message output **SMout** that displays the occurrence of a malfunction. (from DDC4000-Version 1.2)
The output is independent of the status of the command execution check (**CEC**) and parameter **"malfunction blocked"**.
If the unlock catch "**ResSM**" is not switched there is a malfunction if at least one of the malfunction message inputs **SM** = 1.
If input "**ResSM**" is switched the malfunction message output is only reset if there is no other malfunction and the unlocking was released (this implements stopping the malfunction message).



Reset malfunction message is not occupied



Reset malfunction message is occupied

The objects
H501 Cover open/closed
H611 Valve open/closed
H801 Volume flower counter constant
do not have a malfunction message output as they do not have a malfunction message input.

4.3.3.8. H301 Steam moistening unit constant

Function summary

Areas of use: steam moistening unit with the following are supported:

- separate steam feed
- own steam generation with small tank (start-up with Y not equal to 0%)
- own steam generation with large tank (separate heating requirement before operation)

The "steam moistening unit constant" function block controls a steam moistening unit with target setting of 0..100%.
The function block supports:

- Generating an operating target state / control during the movement phase/ Handling the standby message
- Advance switch off (for fighting legionella)
- Command execution check
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Beg. Automatic	actual value deletable boolean	--	--	deleted	--
2	**Ysoll** Setpoint.Autom	set point float	0	100	50	%
3	**GwYsoll** Limitval.Yset	set point float	0	100	3	%
4	**Vorab** Advance switch off	actual value deletable boolean	--	--	deleted	--
5	**BM** Operation	actual value deletable boolean	--	--	deleted	--
6	**Bereit** Ready	actual value deletable boolean	--	--	deleted	--
7	**tBAK** tBAK	set point float	0	+infinity	30	s
8	**VzBAK** VzBAK	set point float	0	+infinity	20	s
9	**SM** SM	actual value deletable boolean	--	--	deleted	--
10	**ResSM** ResSM	actual value deletable boolean	--	--	deleted	--
11	**StSperr** SM blocked	set point boolean	--	--	0	--
12	**Z** Z- influence	set point deletable float	0	100	deleted	%
13	**Rep** Rep.switch	actual value deletable boolean	--	--	deleted	--
14	**Hand** Manual	actual value deletable float	0	100	deleted	%
15	**DBE** DBE	actual value deletable boolean	--	--	deleted	--
16	**Zw** Forced control	actual value deletable boolean	--	--	deleted	--
17	**ZwSw** Setpt forced control	set point float	0	100	0	%
18	**Y** Y	actual value float	0	100	0	%

No.	name of parameter	parameter typ	min	max	init	unit
19	**Anf** Beg	actual value boolean	--	--	0	--
20	**stBAK** Status BAK	actual value boolean	--	--	0	--
21	**SMout** SMout	actual value boolean	--	--	0	--

Generating the target operating state / control during the movement phase / handling the standby message

If the **AnfAuto** input is deleted a request is detected by whether the **Ytarget** is above a limiting value **GwYtarget**. The limiting value view of **GwYtarget** is marked with a fixed hysteresis (Xsd) of 3%.

The monitoring of the flow must be guaranteed by advance regulation or control.

The target operating status **"request steam moistening unit"** is formed from the view above and from **advance, Z, DOL, manual, Zw and ZwSw, Rep, SM**, see below for priorities.

The following different movement methods are used for the steam moistening unit:

1. **AnfAuto** is deleted and **GwYtarget** equals 0 :
   If a **Ytarget** > 0 % is stipulated **"request steam moistening unit"** is set to 1 and **Y** is set to **Ytarget**.
2. **AnfAuto** is deleted and **GwYtarget** is greater than 0 :
   There is a request if **Ytarget** exceeds the value of **GwYtarget**. **"Request steam moistening unit"** is then set to 1. If the **"standby message"** is deleted **Y** is immediately set to **Ytarget** otherwise the occurrence of the **"standby message"** is awaited.
3. **AnfAuto** is not deleted :
   After the existence of a request (**AnfAuto** = 1) **"request steam moistening unit"** is set to 1 and the **"operating message"** is awaited. If this does not occur in time the control execution check is released. If the **"standby message"** is deleted **Y** is immediately set to **Ytarget** otherwise after setting the **"request steam moistening unit"** the occurrence of the **"standby message"** is awaited.

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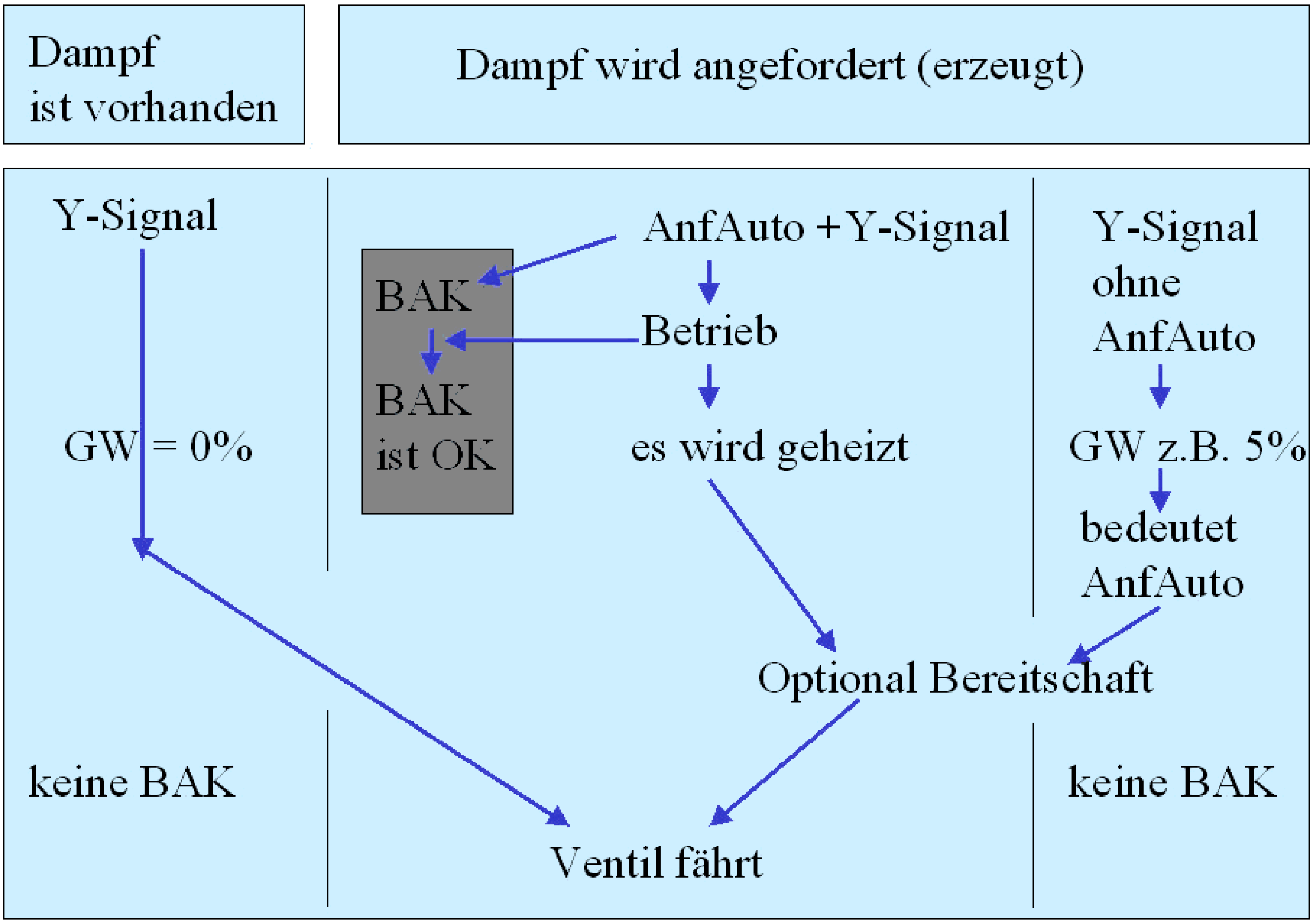
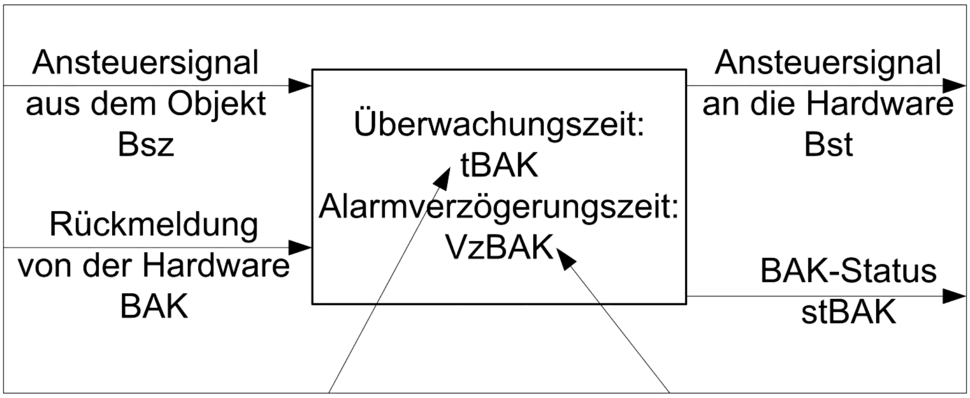


Advance switch off

The function block includes an input for advance switch-off. In automatic operation the steam moistening unit is switched off if this input **Advoff** is switched to 1. The aim is to ventilate the channel to fight legionella in line with VDI 6022. Advance switch off is ignored for non-automatic operation.

Command execution check

The function block contains a command execution check (for description and parameter refer to command execution check section) for the actual operating status **"operating message steam moistening unit",** the target operating status **"requests steam moistening unit"** and the output **"Status command execution check"**.



HWO parameter	corresponding general CEC parameter
Anf	Control signal from the object **Bsz**
BM	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Anf	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

A neighboring fault **SM** may not influence the control of output**Y**

1. (**"fault blocked"** = 0
2. sets the output **Y** to 0% and **Anf** to 0 (**"Fault blocked"** = 1)

If a fault sets the output **Y** to 0% this can only be reset by activating the **"Unlock fault catch"**.

If **"unlock fault catch"** is not wired neighboring faults are not saved, i.e. if the fault disappears the fault handling disappears.

Switching priorities

The function block supplies an output signal **"Target setting steam moistening unit"**.

Priority	Parameter / Value	Action
Highest	**SM**	See "effects of malfunctions on operating behavior" section.
	Rep	**Y** = 0%, **Anf** = 0
	Zw	**Y** = **ZwSw**

Priority	Parameter / Value	Action
	Manual	**Y** = **Manual**
	DOL	**Y = 0%, Anf = 0**
	Z	**Y** = **Z**
	Preset = 1	**Y** = 0%, **Anf** = 0
lowest	**Auto**	**Y** = **Ytarget**

4.3.3.10. H401 Electrical air heater single stage

Function summary

The "electrical fan heater single stage" function block controls a single-stage electrical fan heater and supports:

- Generating the operating release
- Operating hours / limiting value
- Command execution check
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**BM** Plant message Er	actual value deletable boolean	--	--	deleted	--
4	**GW1Ein** GW1ON	set point integer	0	100	60	%
5	**GW1Aus** GW1OFF	set point integer	0	100	20	%
8	**STB** STB	actual value deletable boolean	--	--	deleted	--
9	**DBE** DBE	actual value deletable boolean	--	--	deleted	--
10	**Hand** Manual influence	set point multistate	--	3	0	value,text 9,Auto 0,Off 1,On
11	**Ysoll** Yset	actual value deletable integer	0	100	deleted	%
12	**LSÜ** Airstream monitoring	actual value deletable boolean	--	--	deleted	--
13	**Rep** Repare switch	actual value deletable boolean	--	--	deleted	--
14	**ResSM** SelfRestore	actual value deletable boolean	--	--	deleted	--
15	**SM** Clear malf.	actual value deletable boolean	--	--	deleted	--
16	**StSperr** Malfunction blocked	set point boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
17	**VzBAK** stBAK delayed	set point integer	0	2147483647	0	s
18	**Z** Z- influence	set point multistate	--	3	0	value,text 9,Auto 0,Off 1,On
19	**Zw** Forced control	set point multistate	--	3	0	value,text 9,Auto 0,Off 1,On
20	**gBh** Limit value infringement	actual value boolean	--	--	0	--
21	**Erh1** Anfo heater 1	actual value boolean	--	--	0	--
25	**stBAK** Malf. BAK	actual value boolean	--	--	0	--
30	**tBAK** Delay BAK	set point integer	0	2147483647	30	s
31	**Bh** Operating hours	set point integer	0	2147483647	0	h
32	**BhAktiv** Active opr. hours	set point boolean	--	--	0	--
33	**BhGw** Total opr.hours	set point integer	0	2147483647	0	h
34	**ResBh** Reset opr. hours	actual value deletable boolean	--	--	deleted	--
35	**SMout** SMout	actual value boolean	--	--	0	--

Function description

Generating the operating release

A request in automatic operation is recognized by the Ytarget as being above a limiting value **GWOn** (Basis: 60%). It is ended when the value is lower than the limiting value **GWOff** (Basis: 20 %). In addition for a request the "**air flow monitoring"** (even in Z-, forced or manual operation) must provide a normal message.

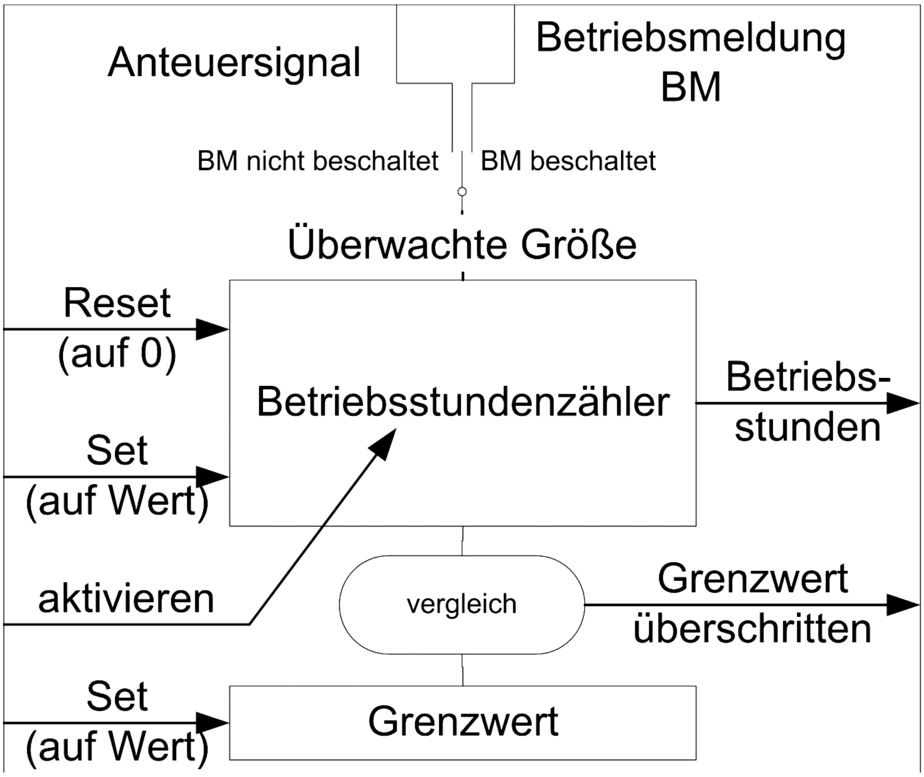
The " **safety temperature limiter"** also ends the request chain in non-automatic operation.

In Z-, forced or manual operation the limiting value above is not checked.

Operating hours / limiting value

The operating hours of the single-stage electrical fan heater can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded a message is produced. If the input for the heater operating message is not switched the output "**Heater Level 1 on"** is used for counting.

Note: The parameter names of the operating hour counter are different from those described in the "Repeating function elements" section.



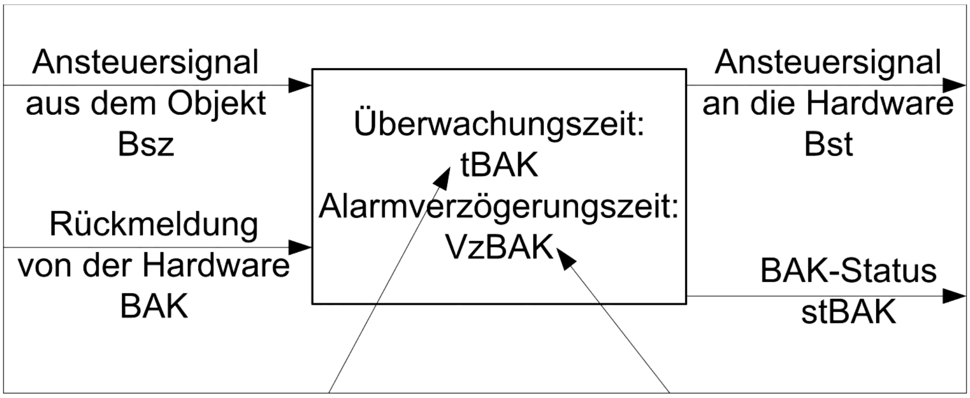
HWO parameter	corresponding general operating hour parameter
Erh1	Control signal
BM	Operating message
ResBh	Reset operating hours
Bh	Set operating hours
BhActive	activate
BhGw	Set limiting value
Bh	Operating hours
gBh	Limiting value exceeded

Command execution check

The function block contains a command execution check (refer to the command execution check for description and parameters) for the actual operating status: **"Operating message heater single stage"**, target operating status: **"Heater level 1 on"**, output: **"Status command execution check"**:

If the actual operating status is not switched no corresponding command execution check malfunction is signaled (**stCEC**).

"Release malfunction catch" resets the command execution check malfunction.
Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general CEC parameter
Erh1	Control signal from the object **Bsz**
BM	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Erh1	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

Malfunction catch / malfunction handling

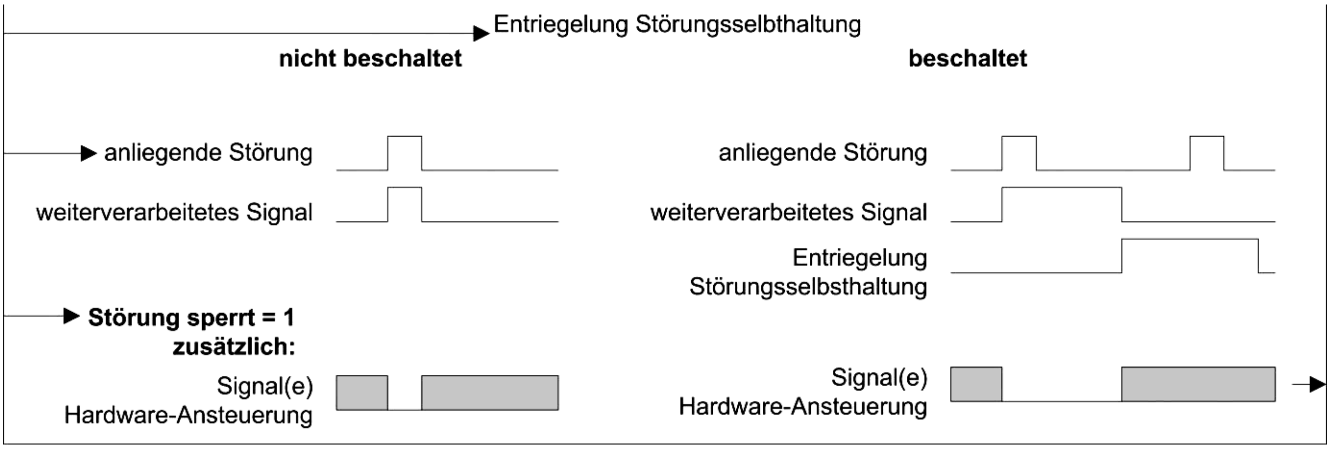
If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

An adjoining malfunction**SM** or **stCEC** may influence the control of the **"Heater level 1 on"** output.

1. not (**"malfunction blocked"** = 0)
2. switches off the **"Heater level 1 on"** output (**"malfunction blocked"** = 1)

If a malfunction sets the output **"Heater level 1 on"** to off, this can only be reset by activating the **"unlock malfunction latch"**.

If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM **stCEC**	Malfunction(s) occurring
StLock	Malfunction blocked
Erh1	Hardware control signal

Status control/switch priorities

The following input parameters influence the control of the outputs:
Z(on/off), DOL, manual(on/off), Zw(on/off), Rep, SM

Priority	Parameter / Value	Impact
Highest	**SM**	Refer to "Trouble-shooting" section
	Manual/open, Zw/open, Rep	**Heater level 1 on** = 0
	Manual/open, Zw/open	**Heater level 1 on** = 1 depending on **LSÜ** and **STB**
	Z/closed, DOL	**Heater level 1 on** = 0
	Z/On	**Heater level 1 on** = 1 depending on **LSÜ** and **STB**
lowest	**Auto**	**"Heater level 1 on"** = 1 depending on **Ytarget**, **LSÜ** and **STB**

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.3.11. H402 Electrical air heater 2 stage

Function summary

The "electrical fan heater two stage" function block controls a two-stage electrical fan heater and supports:

- Generating the operating release
- Operating hours / limiting value
- Command execution check
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**BM1** Plant message St1	actual value deletable boolean	--	--	deleted	--
2	**BM2** Plant message St2	actual value deletable boolean	--	--	deleted	--
4	**GW1Ein** GW1ON	set point integer	0	100	40	%
5	**GW1Aus** GW1OFF	set point integer	0	100	20	%
6	**GW2Ein** GW2ON	set point integer	0	100	70	%
7	**GW2Aus** GW2OFF	set point integer	0	100	55	%
8	**STB** STB	actual value deletable boolean	--	--	deleted	--
9	**DBE** DBE	actual value deletable boolean	--	--	deleted	--
10	**Hand** Manual influence	set point multistate	--	4	0	value,text 9,Auto 0,Off 1,Level 1 2,Level 2
11	**Ysoll** Yset	actual value deletable integer	0	100	deleted	%
12	**LSÜ** Air stream monitoring	actual value deletable boolean	--	--	deleted	--
13	**Rep** Rep.switch	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
14	**ResSM** SelfRestore	actual value deletable boolean	--	--	deleted	--
15	**SM** Clear malf.	actual value deletable boolean	--	--	deleted	--
16	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
17	**VzBAK** stBAK delayed	set point integer	0	2147483647	0	s
18	**Z** Z- influence	set point multistate	--	4	0	value,text 9,Z-Auto 0,Z-OFF 1,Z-Level 1 2,Z-Level 2
19	**Zw** Forced control	set point multistate	--	4	0	value,text 9,Auto 0,Off 1,Level 1 2,Level 2
20	**gBh** GW-Verl. Bh	actual value boolean	--	--	0	--
21	**Erh1** Anfo heater 1	actual value boolean	--	--	0	--
22	**Erh2** Anfo heater 2	actual value boolean	--	--	0	--
25	**stBAK1** Malf. BAK 1	actual value boolean	--	--	0	--
26	**stBAK2** Malf. BAK2	actual value boolean	--	--	0	--
30	**tBAK** Delay BAK	set point integer	0	2147483647	30	s
31	**Bh** Operating hours	set point integer	0	2147483647	0	h
32	**BhAktiv** Active opr. hours	set point boolean	--	--	0	--
33	**BhGw** Total opr.hours	set point integer	0	2147483647	0	h
34	**ResBh** Reset opr. hours	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
35	**SMout** SMout	actual value boolean	--	--	0	--

Generating the operating release

A Level 1 release is recognized by the Ytarget as being above a limiting value **GW1On** (Basis: 40 %). It is ended when the value is lower than the limiting value **GW1Off** (Basis: 20 %). For the level 2 requests the **GW2On** (Basis: 20 %) and **GW2Off** (Basis: 55 %) limiting values apply. In addition for a request the "**air flow monitoring"** (even in Z-, forced or manual operation) must provide a normal message.

The outputs "**Heater level 1 on"** and **"Heater Level 2 on"** outputs are not locked against each other.

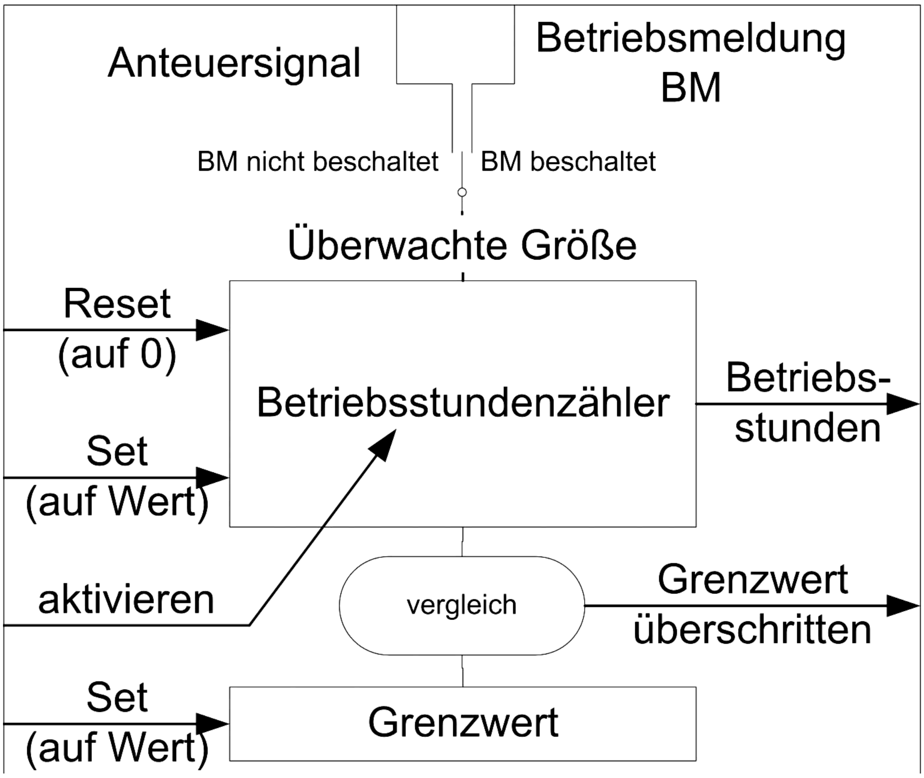
The " **safety temperature limiter"** also ends the request chain in non-automatic operation.

In Z-, forced or manual operation the limiting value above is not checked.

Operating hours / limiting value

The operating hours of the two-stage electrical fan heater can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded a message is produced. If the corresponding input for the heater operating message is not switched the output **"Heater Level 1 on"** or **"Heater level 2"**is used for counting.

Note: The parameter names of the operating hour counter are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general operating hour parameter
Erh1 or Erh2	Control signal
BM1 or BM2	Operating message
ResBh	Reset operating hours
Bh	Set operating hours
BhActive	activate
BhGw	Set limiting value
Bh	Operating hours
gBh	Limiting value exceeded

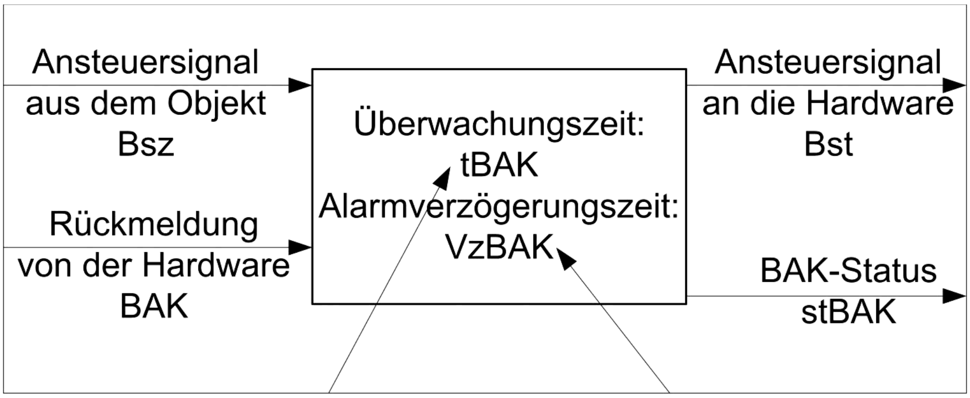
Command execution check

The function block contains a command execution check (refer to the command execution check for description and parameters) for the actual operating status for both fan heater levels: **"Operation message heater level 1** or **2"**, target operational status: **"Heater level 1 on"** or **"Heater level 2 on"**, outputs: **"Status command execution check 1"**or **"Status command execution check 2"**

If the actual operating status is not switched no corresponding command execution check malfunction is signaled (**stCEC1, stCEC2**).

"Release malfunction catch" resets the command execution check malfunction.

Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general CEC parameter
Erh1 or Erh2	Control signal from the object **Bsz**
BM1 or BM2	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Erh1 or Erh2	Control signal to the hardware **Bst**
stCEC1 or stCEC2	CEC status **stCEC**

Malfunction catch / malfunction handling

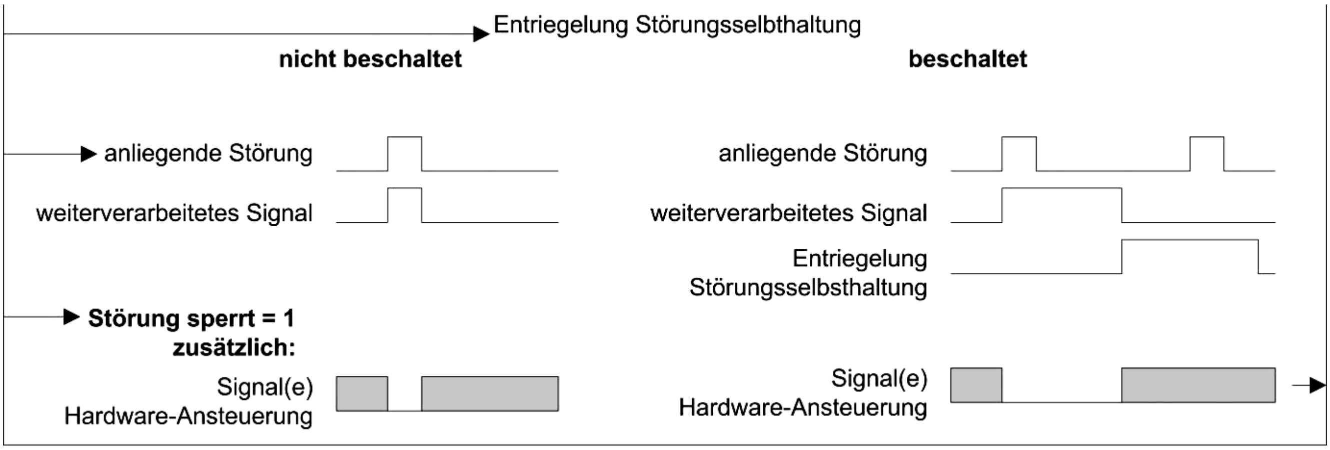
If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
A malfunction that occurs **SM** may influence the control of the outputs **"Heater level 1"** and **"Heater level 2"**.

1. not (**"malfunction blocked"** = 0)
2. switches off the **"Heater level 1 on"** and **"Heater level 2 on"** outputs (**"malfunction blocked"** = 1)

A malfunction caused by the command execution check **stCEC1** or **stCEC2** switches off the relevant output **"Heater level 1 on"** or **"Heater level 2 on"**.

If the malfunction switches off the outputs **"Heater level 1 on",** and **"Heater level 2 on"** this can only be reset by activating the **"release malfunction catch"**.

If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM **stCEC**	Malfunction(s) occurring
StLock	Malfunction blocked
Erh1 and Erh2	Hardware control signal

Status control/switch priorities

The following input parameters influence the control of the outputs:
Z(Off/Level 1/Level 2), DOL, Manual(Off/Level 1/Level 2), Zw(Off/Level 1/Level 2), SM

Priority	Parameter / Value	Impact
Highest	**SM**	Refer to "Trouble-shooting" section
	Manual/open, Zw/open, Rep	**"Heater level 1 on"** = 0 **"Heater level 2 on"** = 0
	Manual/Level 2, Zw/Level 2	**"Heater level 1 on"** = 1 **"Heater level 2 on"** = 1 depending on **LSÜ** and **STB**
	Manual/Level 1, Zw/Level 1	**"Heater level 1 on"** = 1 depending on **LSÜ** and **STB**
	Z/closed, DOL	**"Heater level 1 on"** = 0 **"Heater level 2 on"** = 0
	Z/Level 2	**"Heater level 1 on"** = 1 **"Heater level 2 on"** = 1 depending on **LSÜ** and **STB**
	Z/Level 1	**"Heater level 1 on"** = 1 depending on **LSÜ** and **STB**

Priority	Parameter / Value	Impact
lowest	**Auto**	**"Heater level 1 on"** = 1 and/or **"Heater level 2 on"** depending on **Ytarget**, **LSÜ** and **STB**

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.3.12. H403 Electrical air heater 3 stage

Function summary

The "electrical fan heater three stage" function block controls a three-stage electrical fan heater and supports:

- Generating the operating release
- Operating hours / limiting value
- Command execution check
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**BM1** Plant message St1	actual value deletable boolean	--	--	deleted	--
2	**BM2** Plant message St2	actual value deletable boolean	--	--	deleted	--
3	**BM3** Plant message St3	actual value deletable boolean	--	--	deleted	--
4	**GW1Ein** GW1ON	set point integer	0	100	30	%
5	**GW1Aus** GW1OFF	set point integer	0	100	10	%
6	**GW2Ein** GW2ON	set point integer	0	100	60	%
7	**GW2Aus** GW2OFF	set point integer	0	100	40	%
8	**STB** STB	actual value deletable boolean	--	--	deleted	--
9	**DBE** DBE	actual value deletable boolean	--	--	deleted	--
10	**Hand** Manual influence	set point multistate	--	5	0	value,text 9,Auto 0,Off 1,Level 1 2,Level 2 3,Level 3
11	**Ysoll** Yset	actual value deletable integer	0	100	deleted	%

No.	name of parameter	parameter typ	min	max	init	unit
12	**LSÜ** Air stream monitoring	actual value deletable boolean	--	--	deleted	--
13	**Rep** Rep.switch	actual value deletable boolean	--	--	deleted	--
14	**ResSM** SelfRestore	actual value deletable boolean	--	--	deleted	--
15	**SM** Clear malf.	actual value deletable boolean	--	--	deleted	--
16	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
17	**VzBAK** stBAK delayed	set point integer	0	2147483647	0	s
18	**Z** Z- influence	set point multistate	--	5	0	value,text 9,Z-Auto 0,Z-OFF 1,Z-Level 1 2,Z-Level 2 3,Z-Level 3
19	**Zw** Forced control	set point multistate	--	5	0	value,text 9,Auto 0,Off 1,Level 1 2,Level 2 3,Level 3
20	**gBh** LV-viol. Bh	actual value boolean	--	--	0	--
21	**Erh1** Anfo heater 1	actual value boolean	--	--	0	--
22	**Erh2** Anfo heater 2	actual value boolean	--	--	0	--
23	**Erh3** Anfo heater 3	actual value boolean	--	--	0	--
25	**stBAK1** Malf. BAK 1	actual value boolean	--	--	0	--
26	**stBAK2** Malf. BAK2	actual value boolean	--	--	0	--
27	**stBAK3** Malf. BAK3	actual value boolean	--	--	0	--
30	**tBAK** Delay BAK	set point integer	0	2147483647	30	s

No.	name of parameter	parameter typ	min	max	init	unit
31	**Bh** Operating hours	set point integer	0	2147483647	0	h
32	**BhAktiv** Active opr. hours	set point boolean	--	--	0	--
33	**BhGw** Total opr.hours	set point integer	0	2147483647	0	h
34	**ResBh** Reset opr. hours	actual value deletable boolean	--	--	deleted	--
35	**GW3Ein** GW3ON	set point integer	0	100	90	%
36	**GW3Aus** GW3OFF	set point integer	0	100	70	%
37	**SMout** SMout	actual value boolean	--	--	0	--

Function description

Generating the operating release

A Level 1 release is recognized by the Ytarget being above a limiting value **GW1On** (Basis: 30 %). It is ended when the value is lower than the limiting value **GW1Off** (Basis: 10 %). For the release of level 2 the **GW2On** (Basis: 60 %) and **GW2Off** (Basis: 40 %) limiting values apply. For the release of level 3 the **GW3On** (Basis: 90 %) and **GW3Off** (Basis: 70 %) limiting values apply. In addition for a request the "**air flow monitoring"** (even in Z-, forced or manual operation) must provide a normal message.

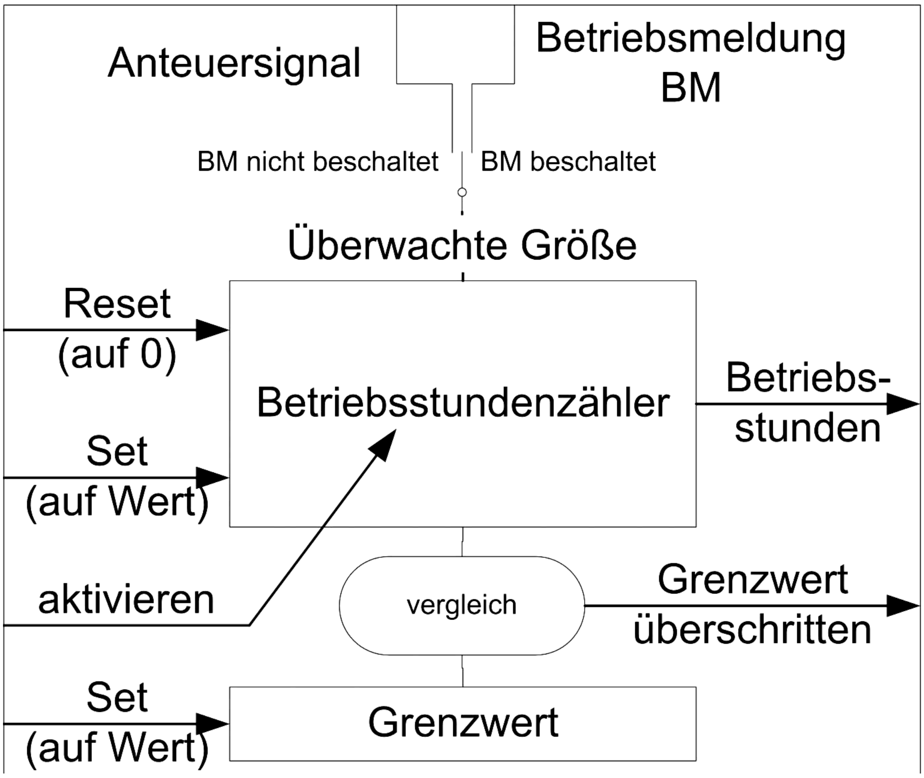
The outputs "**Heater level 1 on"** and **"Heater Level 2 on"** and**"Heater level 3 on"** are <u>not</u> locked against each other.

The " **safety temperature limiter"** also ends the request chain in non-automatic operation.

In Z-, forced or manual operation the limiting value above is not checked.

Operating hours / limiting value

The operating hours of the three-stage electrical fan heater can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded a message is produced. If the corresponding input for the electrical heater operating message is not switched the output "**Heater Level 1 on"**, **"Heater level 2"** or **"Heater level 3"**is used for counting.
Note: The parameter names of the operating hour counter are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general operating hour parameter
Erh1 or Erh2 or Erh3	Control signal
BM1 or BM2 or BM3	Operating message
ResBh	Reset operating hours
Bh	Set operating hours
BhActive	activate
BhGw	Set limiting value
Bh	Operating hours
gBh	Limiting value exceeded

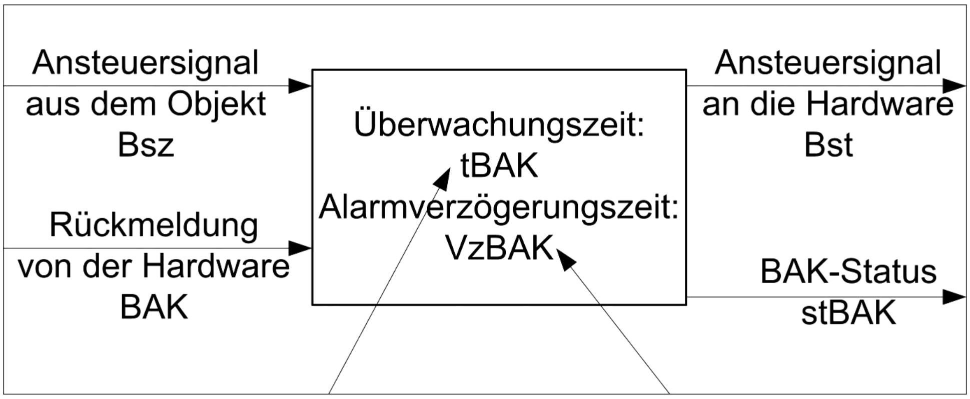
Command execution check

The function block contains a command execution check (refer to the command execution check for description and parameters) for the actual operating status for the three fan heater levels: **"Operation message heater level 1, 2** or **2"**, target operating status: **"Heater level 1 on", "Heater level 2 on"** or **"Heater level 3 on"**, outputs: **"Status command execution check 1", "Status command execution check 2"** or **"Status command execution check 3"**.

If the actual operating status is not switched no corresponding command execution check malfunction is signaled (**stCEC1, stCEC2, stCEC3**).

"Release malfunction catch" resets the command execution check malfunction.

Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general CEC parameter
Erh1 or Erh2 or Erh3	Control signal from the object **Bsz**
BM1 or BM2 or BM3	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Erh1 or Erh2 or Erh3	Control signal to the hardware **Bst**
stCEC1 or stCEC2 or stCEC3	CEC status **stCEC**

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

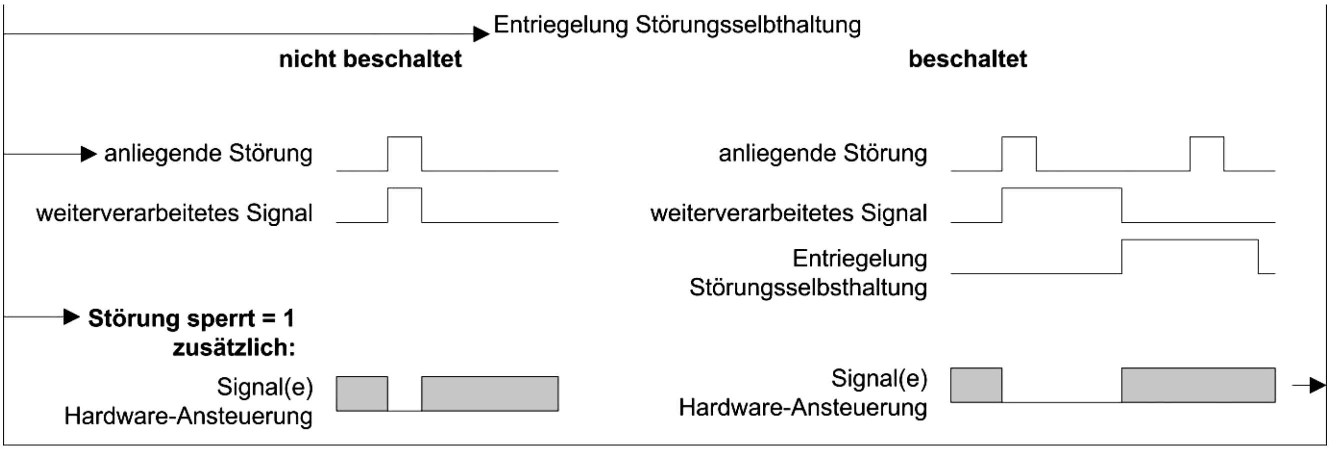
A malfunction that occurs **SM** may influence the control of the outputs **"Heater level 1", "Heater level 2"** and **"Heater level 3"**.

- not (**"malfunction blocked"** = 0
- switches off the **"Heater level 1 on", "Heater level 2 on"** and **"Heater level 3 on"**outputs (**"malfunction blocked"** = 1)

a malfunction caused by the command execution check **stCEC1, stCEC2** or **stCEC3** switches off the relevant output **"Heater level 1 on"**, **"Heater level 2 on"** or **"Heater level 3 on"**.

If the malfunction switches off the outputs **"Heater level 1 on", "heater level 2 on"** and **"Heater level 3 on"** this can only be reset by activating the **"release malfunction catch"**.

If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM **stCEC**	Malfunction(s) occurring
StLock	Malfunction blocked
Erh1 and Erh2 and Erh3	Hardware control signal

Status control/switch priorities

The following input parameters influence the control of the outputs:
Z(Off/Level 1/Level 2/Level 3), DOL, Manual(Off/Level 1/Level 2/Level 3), Zw(Off/Level 1/Level 2/Level 3), SM

Priority	Parameter / Value	Impact
Highest	**SM**	Refer to "Trouble-shooting" section
	Manual/open, Zw/open, Rep	**"Heater level 1 on"** = 0 **"Heater level 2 on"** = 0 **"Heater level 3 on"** = 0
	Manual/Level 3, Zw/Level 3	**"Heater level 1 on"** = 1 **"Heater level 2 on"** = 1 **"Heater level 3 on"** = 1 depending on **LSÜ** and **STB**
	Manual/Level 2, Zw/Level 2	**"Heater level 1 on"** = 1 **"Heater level 2 on"** = 1 depending on **LSÜ** and **STB**
	Manual/Level 1, Zw/Level 1	**"Heater level 1 on"** = 1 depending on **LSÜ** and **STB**
	Z/closed, DOL	**"Heater level 1 on"** = 0 **"Heater level 2 on"** = 0 **"Heater level 3 on"** = 0

Priority	Parameter / Value	Impact
	Z/Level 3	**"Heater level 1 on"** = 1 **"Heater level 2 on"** = 1 **"Heater level 3 on"** = 1 depending on **LSÜ** and **STB**
	Z/Level 2	**"Heater level 1 on"** = 1 **"Heater level 2 on"** = 1 depending on **LSÜ** and **STB**
	Z/Level 1	**"Heater level 1 on"** = 1 depending on **LSÜ** and **STB**
lowest	**Auto**	**"Heater level 1 on"** = 1 and/or **"Heater level 2 on"** = 1 and/or **"Heater level 3 on"** = 1 depending on **Ytarget**, **LSÜ** and **STB**

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.3.13. H404 Electrical air heater constant

Function summary

The "electrical fan heater constant" function block controls a constant electrical fan heater and supports:

- Generating the operating release
- Command execution check
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**BM** About message	actual value deletable boolean	--	--	deleted	--
4	**GWYsoll** GWYset	set point integer	0	100	5	%
6	**Y** Setp. heater	actual value integer	0	100	1	%
8	**STB** STB	actual value deletable boolean	--	--	deleted	--
9	**DBE** DBE	actual value deletable boolean	--	--	deleted	--
10	**Hand** Manual influence	set point deletable integer	0	100	deleted	%
11	**Ysoll** Yset	actual value deletable integer	0	100	deleted	%
12	**LSÜ** Air stream monitoring	actual value deletable boolean	--	--	deleted	--
13	**Rep** Repair switch	actual value deletable boolean	--	--	deleted	--
14	**ResSM** SelfRestore	actual value deletable boolean	--	--	deleted	--
15	**SM** Clear malf.	actual value deletable boolean	--	--	deleted	--
16	**StSperr** Malfunction blocks	set point boolean	--	--	0	--
17	**VzBAK** stBAK delayed	set point integer	0	2147483647	0	s

No.	name of parameter	parameter typ	min	max	init	unit
18	**Z** Z- influence	set point deletable integer	0	100	deleted	%
19	**Zw** Forced control	set point deletable integer	0	100	deleted	%
21	**Anf** Anfo recv contin.	actual value boolean	--	--	0	--
25	**stBAK** Malf. BAK	actual value boolean	--	--	0	--
30	**tBAK** Delay BAK	set point integer	0	2147483647	30	s
31	**SMout** SMout	actual value boolean	--	--	0	--

Function description

Generating the operating release

A request in automatic operation is recognized by the Ytarget being above a limiting value **GWYtarget** (Basis: 5%). The limiting value view is marked with a fixed hysteresis (Xsd) of 3%. In addition for a request the "**air flow monitoring"** (even in Z-, forced or manual operation) must provide a normal message.

The " **safety temperature limiter"** also ends the request chain in non-automatic operation.

In Z-, forced or manual operation the limiting value above is not checked.
The target operating status **"request electrical fan heater constant"** is formed from the view above and from **, Z, DOL, manual, Zw** and **ZwSw, Rep, SM**, see below for priorities.

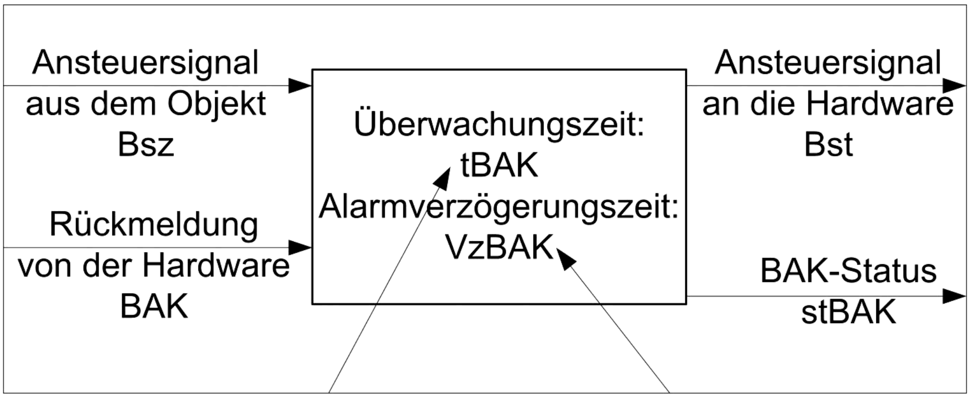
Command execution check

The function block contains a command execution check (refer to the command execution check for description and parameters) for the actual operating status: **"Operating message electrical fan heater"**, Target operating status: **"request electrical fan heater constant"**, output: **"Status Command execution check"**

If the actual operating status is not switched no corresponding command execution check malfunction is signaled (**stCEC**).

"Release malfunction catch" resets the command execution check malfunction.

Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general CEC parameter
Anf	Control signal from the object **Bsz**
BM	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Anf	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

Malfunction catch / malfunction handling

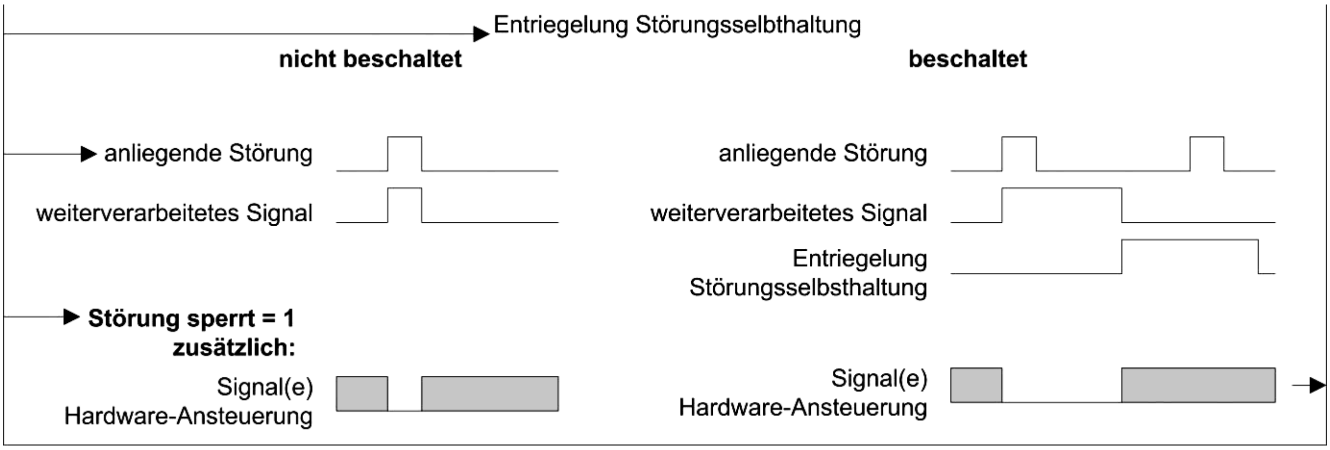
If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

An adjoining malfunction**SM** or **stCEC** may influence the control of the **"request electrical fan heater constant"** output.

1. not (**"malfunction blocked"** = 0)
2. switches off the **"request electrical fan heater"** output (**"malfunction blocked"** = 1)

If a malfunction sets the output **"request electrical fan heater constant"** to off, this can only be reset by activating the **"unlock malfunction catch"**.

If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM **stCEC**	Malfunction(s) occurring
StLock	Malfunction blocked
Anf	Hardware control signal

Status control/switch priorities

The function block supplies an output signal **"Target position electrical heater constant"**. The following input parameters influence the control of the outputs:
Z(on/off), DOL, manual(on/off), Zw(on/off), Rep, SM

Priority	Parameter / Value	Action
Highest	**SM**	See "effects of malfunctions on operating behavior" section.
	Rep	**Y** = 0%, **Anf** = 0
	Zw	**Y** = **ZwSw**, **Anf** = 1 depending on **LSÜ** and **STB**
	Manual	**Y = Manual, Anf = 1** **depending on LSÜ and STB**
	DOL	**Y = 0%, Anf = 0**
	Z	**Y** = **Z**, **Anf** = 1 depending on **LSÜ** and **STB**
lowest	**Auto**	**Y = Ytarget** **depending on Ytarget, LSÜ and STB**

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.3.14. H501 Cover open/closed

Function summary

The "cover open/closed" function block controls a cover that can be opened or closed and considers a cover run time.

The function block supports:

- Final position replication
- Command execution check
- Trouble-shooting
- Status control unit using Z influence, DOL, manual influence, forced control

The RPG function block is basically identical to "Valve open/closed", the blocking protection is not required and some parameter names in the DDC4000 object are different.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Begin Automatic	actual value deletable boolean	--	--	deleted	--
2	**Auf** End pos. OPEN	actual value deletable boolean	--	--	deleted	--
3	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--
4	**Hand** Manual influence	set point multistate	--	3	0	value,text 9,Manual Auto 1,Manual OPEN 0,Manual SHUT
5	**ResSM** Entr. Malfunction catch	actual value deletable boolean	--	--	deleted	--
6	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
7	**Stell** Setting	actual value multistate	--	3	1	value,text 1,OPEN 0,SHUT 24,Running
8	**VzBAK** StBAK delayed	set point integer	0	2147483647	0	s
9	**Y** Flap drive	actual value boolean	--	--	0	--
10	**Yr** Set.feedb. flap	actual value deletable integer	0	100	deleted	%

No.	name of parameter	parameter typ	min	max	init	unit
11	**Z** Z- influence	set point multistate	--	3	0	value,text 9,Z-Auto 1,Z OPEN 0,Z SHUT
12	**Zu** End pos. SHUT	actual value deletable boolean	--	--	deleted	--
13	**Zw** Forced control	set point multistate	--	3	0	value,text 9,Forced Auto 1,Forced OPEN 0,Forced SHUT
14	**stBAK** Status BAK	actual value boolean	--	--	0	--
15	**tBAK** Time BAK	set point integer	0	2147483647	30	s
16	**tMot** Motor runtime	set point integer	0	600	120	s

Function description

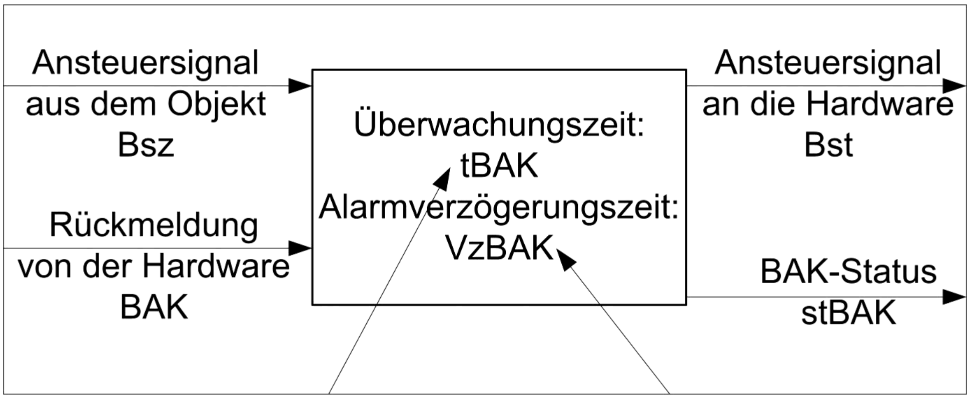
Final position replication

The **"final position open"**, **"final position closed"** and **"position feedback signal cover"** inputs can be wired if required.
If the **"position feedback signal cover"** is wired, but not the**"final position open"** and **"final position closed"**, both final positions are determined via the **"position feedback signal cover"**. If **"position feedback signal cover"** < 3 % a "closed" final position is assumed, if **"position feedback signal cover"** > 97 % an "open" final position is assumed, otherwise "running".
If the plant in addition to **"position feedback signal cover"**is also wired for **"final position open"** or **"final position open"** these inputs have higher priority.
If only one of the **"final position open"** or **"final position closed"** is switched but not **"position feedback signal cover"**, the final position that is not switched is determined via the **"motor operating time"**.
If e.g. only **"final position closed"** is switched after an "open" control the **"Setting"** output is first set to "running" and after the end of the **"Motor operating time"** set to "open".
If both **"final position open"** and **"final position closed"** are not switched the final position replication occurs in the same way for both final positions but a command execution check is not however effective.

Command execution check

The function block contains a command execution check (refer to the command execution check section for description and parameters) for the actual operating status **"Setting"** that is formed as described above.
The target operating status is **"control cover"**; the output is **"Status command execution check"**.

"Release malfunction catch" resets the command execution check malfunction.
Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



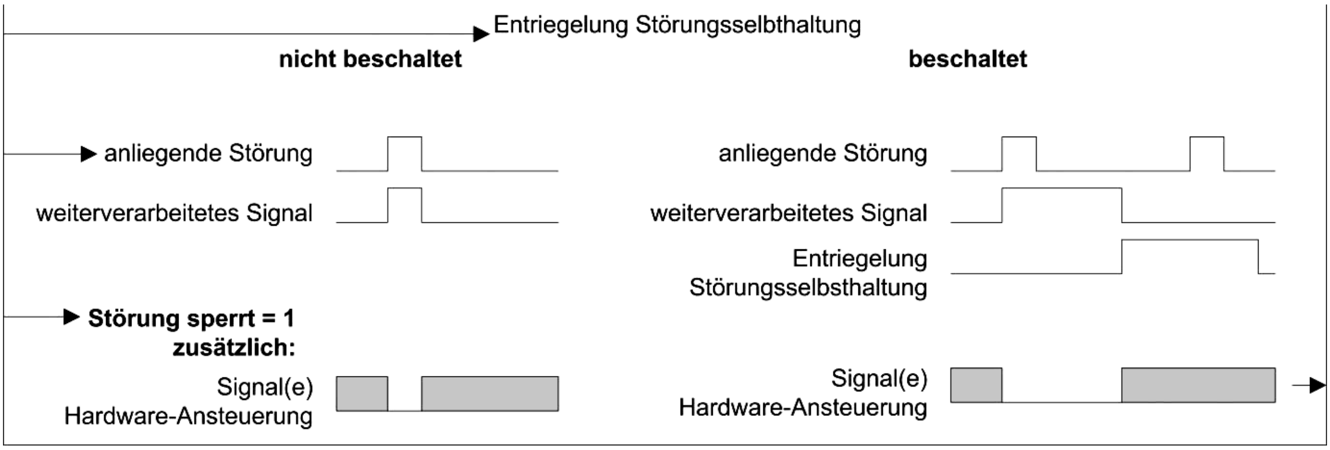
HWO parameter	corresponding general CEC parameter
Y	Control signal from the object **Bsz**
Setting	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Y	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

No input **"Cover malfunction" (SM)**.

An adjoining command execution check may optionally influence the control of the **"control cover"** output
a) not (**"Fault blocked"** = 0)
b) the output **"Control cover"** switched to "closed" (**"malfunction blocked"** = 1)
If a fault sets the output **"control cover"** to "closed" this can only be reset by activating the **"unlock fault catch"**.
If **"unlock fault catch"** is not wired faults that occur are not saved, i.e. if the fault disappears the fault handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
stCEC	Malfunction(s) occurring
StLock	Malfunction blocked
Y	Hardware control signal

Switching priorities

The function block supplies an output signal **"Control valve"**. The following input parameters influence the control of this output:
AnfAuto(open/closed), Z(open/closed), DOL, Manual(open/closed), Zw(open/closed), stCEC

Priority	Parameter / Value	Action
Highest	**StCEC**	Refer to "Trouble-shooting" section
	Manual/Closed, Zw/Closed	Control cover: "closed"
	Manual/open, Zw/open	Control cover: "open"
	Z/closed, DOL	Control cover: "closed"
	Z/open	Control cover: "open"
lowest	**Auto**	Automatic operation

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.3.15. H502 Fire protection cover with drive

Function summary

The "fire protection cover with drive" function block controls a cover that can be opened or closed and considers a motor run time.

The function block supports:

- Monitoring soldered strut contact
- Self-test
- Command execution check
- malfunction catch
- Status control unit using Z influence, manual influence, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfTest** Begin Self-test	actual value deletable boolean	--	--	deleted	--
2	**AnfZu** Begin Flap CLOSED	actual value deletable boolean	--	--	deleted	--
3	**Auf** End pos. OPEN	actual value deletable boolean	--	--	deleted	--
4	**Hand** Manual influence	set point multistate	--	3	0	value,text 9,Auto 1,OPEN 0,SHUT
5	**ResSM** Entr. malfunction catch	actual value deletable boolean	--	--	deleted	--
6	**SMlot** Malf. msg solder contact	actual value deletable boolean	--	--	deleted	--
7	**Stell** Setting (O=0, C=1)	actual value boolean	--	--	0	--
8	**Test** Display self-test	actual value multistate	--	3	2	value,text 24,Test running 1,Test error 0,Test ok
9	**VzBAK** StBAK delayed	set point integer	0	2147483647	0	s
10	**Y** Anst. Flap	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
11	**Z** Z- influence	set point multistate	--	3	0	value,text 9,Auto 1,OPEN 0,SHUT
12	**Zu** to end position	actual value deletable boolean	--	--	deleted	--
13	**Zw** Forced control	set point multistate	--	3	0	value,text 9,Auto 1,OPEN 0,SHUT
14	**stBAK** Status BAK	actual value boolean	--	--	0	--
15	**tBAK** Time BAK	set point integer	0	2147483647	30	s
16	**tMot** Motor runtime	set point integer	0	600	120	s
17	**SMout** SMout	actual value boolean	--	--	0	--

Function description

In automatic operation the fire protection cover can be controlled using **AnfZu**.
If the final position **"closed"** is switched and there is no acknowledgement (**closed** = 1), after the **tCEC** has ended the command execution check is carried out (**stCEC** = 1).

This can be used for example to close the fire protection covers at night (e.g. relevant requirements in Switzerland).
If **AnfZu** is not connected, the position of the fire protection cover can only be changed using **Z**, **manual**, **Zw** and **AnfTest**.
To switch off the fans etc. the **SMlot** soldered strut contact malfunction message is used.

Monitoring soldered strut contact

If parameter **"malfunction message soldered strut contact"** goes to 1, the **"setting"** output is set to "closed".

Self-test

The self-test is started if **AnfZu** is 0 or is not switched and **"request self-test"** goes to 1.
During the self-test **"display self-test"** is set to "running".
The cover is first moved to (**"control cover"**=0). The cover is only opened again if there is a acknowledgement (Closed=1) for a switched "closed" parameter or the motor run time (tMot) and then the "tBaktime" has run out.

If in this time a malfunction for the command execution check is detected **"display self-test"** is set to "malfunction" otherwise it is set to "OK" after the self-test.

In order to specify malfunctions during the self-test **"final position closed"** must be connected.

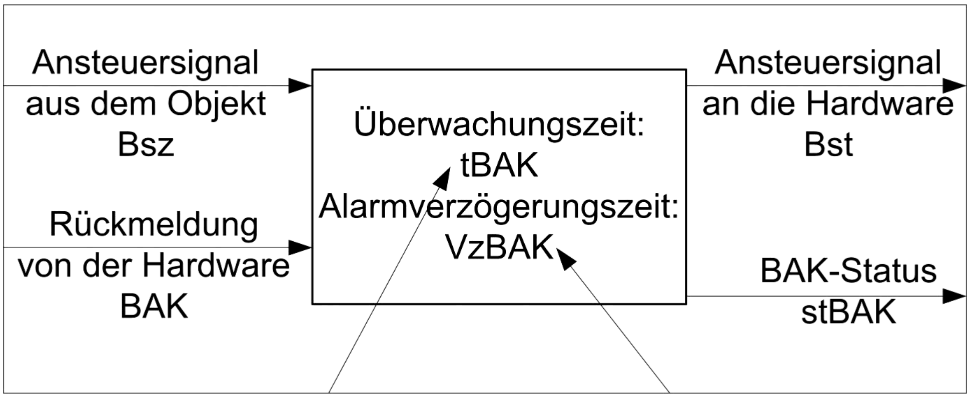
Command execution check

The function block contains a command execution check (refer to the command execution check section for description and parameters) for the actual operating status that is formed from **"final position open"** and **"final position closed"** that is formed as described above. The target operating status is **"control cover"**; the output is **"Status command execution check"**.

In order for the command execution check to be operational **"final position closed"** must be connected, **"final position open"** is optional.

"Release malfunction catch" resets the command execution check malfunction.

Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general CEC parameter
Y	Control signal from the object **Bsz**
OPEN, CLOSED	Acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Y	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

malfunction catch

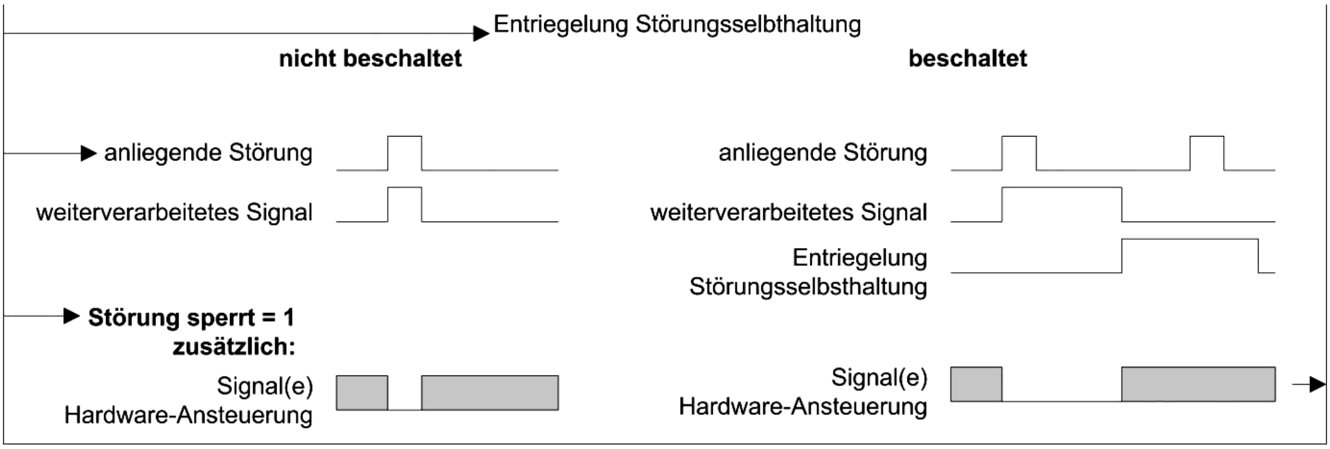
If **"unlock malfunction catch"** is wired a malfunction that occurs in the command execution check is saved and can be reset by activating the **"unlock malfunction catch"**.

If **"Unlock malfunction catch"** is not connected, any malfunctions that occur are not saved.

"malfunction message soldered strut contact" is not caught itself.

Malfunction is not handled.

An adjoining command execution check does not influence the control of the **"control cover"** output



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
stCEC	Malfunction(s) occurring
StLock	Malfunction blocked
Y	Hardware control signal

Switching priorities

The function block supplies an output signal **"Control cover"**. The following input parameters influence the control of this output:
AnfZu, Z(closed/open), manual(closed/open), Zw(closed/open)

Priority	Parameter / Value	Action
Highest	**Manual/Closed, Zw/Closed**	**"Control cover"** = "closed"
	Manual/open, Zw/open	**"Control cover"** = "open"

Priority	Parameter / Value	Action
	Z/closed	**"Control cover"** = "closed"
	Z/open	**"Control cover"** = "open"
	AnfTest	Self-test
lowest	**Auto**	Automatic operation

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.
Forced is prioritized higher than Z. Therefore this cover can be used as a butterfly valve (e.g. with a smoke alarm).

4.3.3.16. H503 Cover 3-point

Function summary

The "3-point cover" function block controls a 3-point cover using an analog signal (0..0.100%).

The function block supports:

- Idle zone
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, forced control

The "3-point cover" function block controls a 3-point cover using an analog signal (0..00.100 %). If the value of the Y output is to be increased an OPEN pulse is created. If the Y signal is to be reduced, a CLOSE pulse is created. Independent of a set idle zone above 97% an ongoing OPEN signal and under 3% an ongoing CLOSE signal is issued.
The length of the OPEN and CLOSE pulses are calculated from the value of the change in the Y output and the motor operating times **tMotAuf** or **tMotZu**. The hardware object can be used for 3-point actuators with and without position feedback signal. If no position feedback signal is available the input values "**final position open"** or "**final position CLOSED"** are analyzed for the synchronization.
When the final positions are reached (for entered sources for open and close final positions) the drive moves to "stop" until it receives a command in the opposite direction < 97% or > 3%.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Auf** End pos. OPEN	actual value deletable boolean	--	--	deleted	--
2	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--
3	**Hand** Manual influence	set point deletable integer	0	100	deleted	%
4	**ResSM** Entr. malfunction catch	actual value deletable boolean	--	--	deleted	--
5	**SM** Malf. with flap	actual value deletable boolean	--	--	deleted	--
6	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
7	**Tot** Signal change deadzone	set point integer	0	50	0	%
8	**Y** Setp. flap	actual value integer	0	100	0	%
9	**YAuf** OPEN Impulse	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
10	**YZu** CLOSED Impulse	actual value boolean	--	--	0	--
11	**Yist** Position display	actual value integer	0	100	0	%
12	**Yr** Servo feedback of flap	actual value deletable integer	0	100	deleted	%
13	**Ysoll** Setp. flap	set point integer	0	100	0	%
14	**Z** Z- influence	set point deletable integer	0	100	deleted	%
15	**Zu** End pos. SHUT	actual value deletable boolean	--	--	deleted	--
16	**Zw** Forced control	set point deletable boolean	--	--	deleted	--
17	**ZwSw** Setp- flap forced control	set point integer	0	100	100	%
18	**tMotAuf** Motor runtime OPEN	set point integer	0	2147483647	120	s
19	**tMotZu** Motor runtime CLOSED	set point integer	0	2147483647	120	s
20	**SMout** SMout	actual value boolean	--	--	0	--

Function description

Position display

There is a **"position display"** output. This indicates this value if the **"position feedback signal cover"** input is occupied. If this acknowledgement is not occupied the value of the **"target position cover"** is used. This may come from **"Target cover position in automatic operation"**, **"Z influence"**, **"set point forced control"** or **"manual influence"**, i.e. from the input with the highest active priority.

Idle zone

If the **"position feedback signal cover"** is not switched on the **"idle zone"** only works on control signal changes if the control signal (**Ytarget**) changes by a higher amount than the idle zone set. If **"position feedback signal cover"** is switched the idle zone works on the difference between the control signal and the position feedback signal (**Yr**). I.e. if the difference reaches a higher amount than the idle zone set, signal changes are issued.

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
A malfunction that occurs **SM** may not influence the control of output**Y**
a) not (**"malfunction blocked"** = 0)
b) sets the output **Y** to 0% (**"malfunction blocked"** = 1)
If a malfunction sets the output **Y** to 0% this can only be reset by activating the **"Unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.

Switching priorities

The function block supplies an output signal **"Target setting valve"**. The following input parameters influence the control of this output:
Ytarget, Z, DOL, Manual, Zw and ZwSw, SM

Priority	Parameter / Value	Action
Highest	**SM**	See "effects of malfunctions on operating behavior" section.
	Zw	**Y** = **ZwSw**
	Manual	**Y** = **Manual**
	DOL	**Y** = 0%
	Z	**Y** = **Z**
lowest	**Auto**	**Y** = **Ytarget**

4.3.3.17. H504 Cover constant

Function summary

The "cover constant" function block controls a constant cover with target setting of 0..100%.
The function block supports:

- Trouble-shooting
- Status control unit using Z influence, DOL, manual influence, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Auf** End pos. OPEN	actual value deletable boolean	--	--	deleted	--
2	**Zu** End pos. SHUT	actual value deletable boolean	--	--	deleted	--
3	**Ysoll** Setp. flap automatic	actual value float	0	100	0	%
4	**Yr** Servo back flap	actual value deletable float	0	100	deleted	%
5	**Yist** Setting no.	actual value float	0	100	0	%
6	**Y** Setp. flap	actual value float	0	100	0	%
9	**DBE** DBE Status	actual value deletable boolean	--	--	deleted	--
10	**Hand** Manual influence	set point deletable integer	0	100	deleted	%
14	**ResSM** Enter malf. msg	set point deletable boolean	--	--	deleted	--
15	**SM** Malf. with flap	actual value deletable boolean	--	--	deleted	--
16	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
18	**Z** Z- influence	set point deletable integer	0	100	deleted	%
19	**Zw** Forced control	actual value deletable boolean	--	--	deleted	--
20	**ZwSw** Setp. flap forced control	set point integer	0	100	100	%

No.	name of parameter	parameter typ	min	max	init	unit
21	**SMout** SMout	actual value boolean	--	--	0	--

Function description

Position display

There is a **"position display"** output. This indicates this value if the **"position feedback signal cover"** input is occupied. If this acknowledgement is not occupied the value of the **"target position cover"** is used. This may come from **"Target cover position in automatic operation"** ,**"Z influence"**, **"set point forced control"** or **"manual influence",** i.e. from the input with the highest active priority.

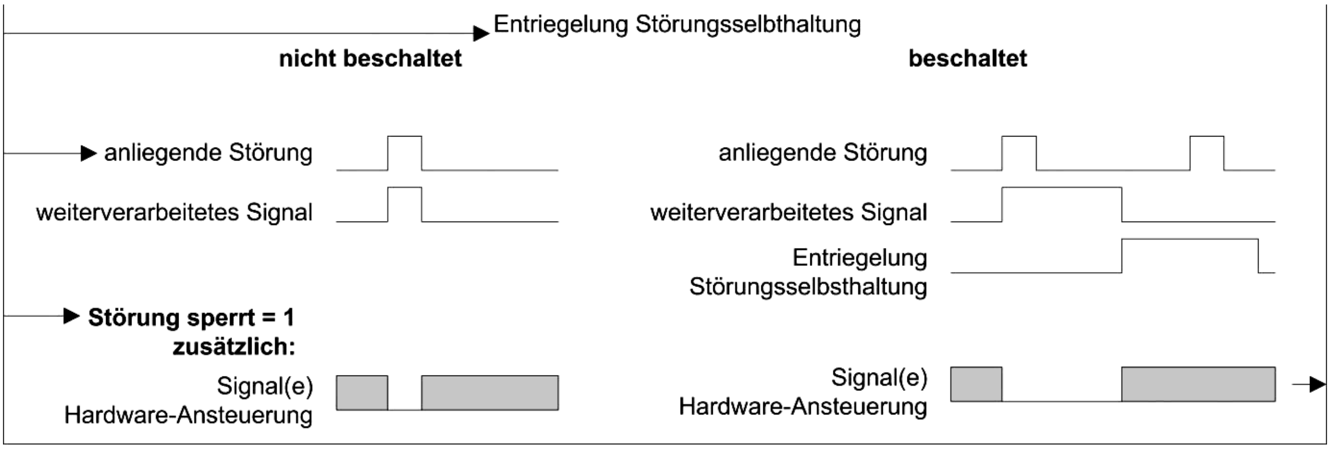
Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

A malfunction that occurs **SM** may not influence the control of output**Y**

a) not (**"malfunction blocked"** = 0)
b) sets the output **Y** to 0% (**"malfunction blocked"** = 1)

If a malfunction sets the output **Y** to 0% this can only be reset by activating the **"Unlock malfunction catch"**. If **"Unlock malfunction catch"** is not connected, any malfunctions that occur are not saved i.e. if the malfunction disappears the trouble-shooting is stopped.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM **stCEC**	Malfunction(s) occurring

HWO parameter	corresponding general operating hour parameter
StLock	Malfunction blocked
Y	Hardware control signal

Switching priorities

The function block supplies an output signal **"Target setting valve"**. The following input parameters influence the control of this output:
Ytarget, Z, DOL, Manual, Zw and ZwSw, SM

Priority	Parameter / Value	Action
Highest	**SM**	See "effects of malfunctions on operating behavior" section.
	Zw	**Y** = **ZwSw**
	Manual	**Y** = **Manual**
	DOL	**Y** = 0%
	Z	**Y** = **Z**
lowest	**Auto**	**Y** = **Ytarget**

4.3.3.18. H601 Fan single stage

Function summary

The "fan single stage" function block controls a single-stage fan and supports:

- cover control during the warm-up phase / request for control
- Operating hours / limiting value
- Switching delays
- Command execution check
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Begin Automatic	actual value deletable boolean	--	--	deleted	--
2	**AnfKl** Begin Flap	actual value boolean	--	--	0	--
3	**AnlVerz** Start delay Automatic	set point integer	0	2147483647	0	s
4	**BMKlAuf** Plant msg: Flap OPEN	actual value deletable boolean	--	--	deleted	--
5	**BMLu** Plant msg: Fan	actual value deletable boolean	--	--	deleted	--
6	**Bh** Operating hours	set point integer	0	2147483647	0	h
7	**BhAktiv** Activate oper.hrs. counting	set point boolean	--	--	0	--
8	**BhGw** Oper.hrs. limit value	set point integer	0	2147483647	0	h
9	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--
10	**Hand** Manual switch	set point multistate	--	3	0	value,text 9,Auto 0,Off 1,On
11	**LEin** Fan ON	actual value boolean	--	--	0	--
12	**Rep** Repair switch	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
13	**ResBh** Reset opr. hours	actual value deletable boolean	--	--	deleted	--
14	**ResSM** Entr. malfunction catch	actual value deletable boolean	--	--	deleted	--
15	**SM** Fan malf.	actual value deletable boolean	--	--	deleted	--
16	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
17	**VzBAK** stBAK delayed	set point integer	0	2147483647	0	s
18	**Z** Z- influence	set point multistate	--	3	0	value,text 9,Auto 0,Off 1,On
19	**Zw** Forced control	set point multistate	--	3	0	value,text 9,Auto 0,Off 1,On
20	**gBh** Limit value error by opr.hrs.	actual value boolean	--	--	0	--
21	**reg** Begin Control	actual value boolean	--	--	0	--
22	**stBAK** Status BAK Fan	actual value boolean	--	--	0	--
23	**tBAK** Delay BAK	set point integer	0	2147483647	30	s
24	**SMout** SMout	actual value boolean	--	--	0	--

Function description

cover control during the warm-up phase / request for control

If the fan is to be switched on the **"cover request"** is first set to 1.
Then there is a pause for the **"operational cover open"** = 1 if this input is wired. Then **"fan on"** is set to 1 and - if connected - the plant waits for **"fan operating message"** = 1. Only then is **"request control"** set to 1.

For **"operational message cover open"** this does not include a command execution check as **"request pump / cover"** should always be linked to a "cover" hardware object that contains its own command execution check.

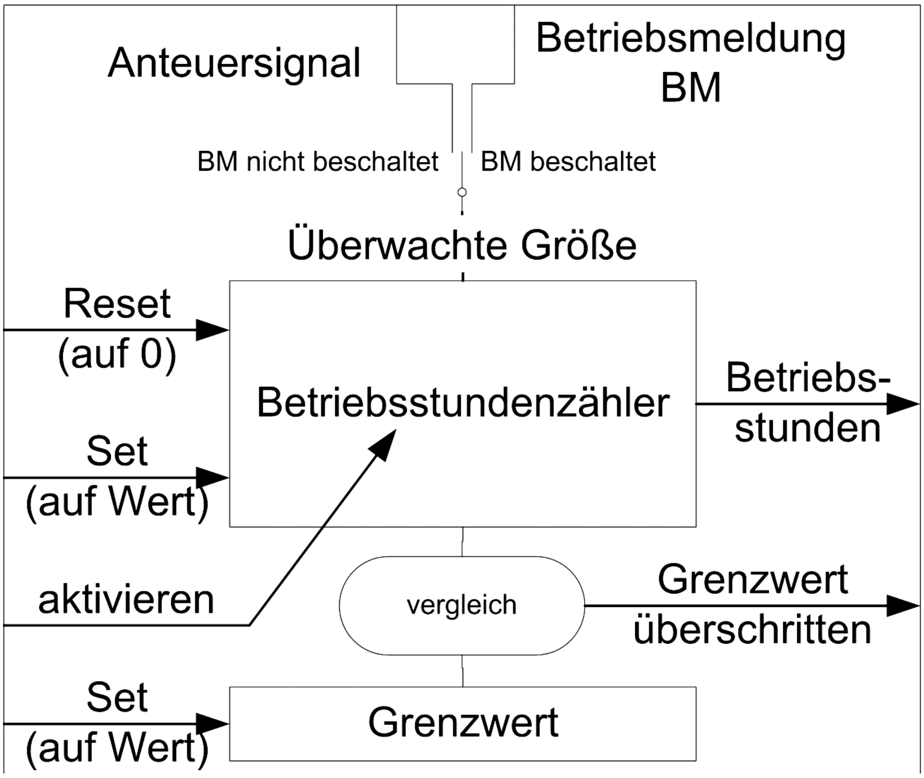
Switching delays

It is possible to delay switching on the automatic operation (**"Delay automatic start"**).

Operating hours / limiting value

The operating hours of the fan can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded a message is produced. If the input for the fan operating message is not switched the control output "**fan on"** is used for counting.

Note: The parameter names of the operating hour counter are different from those described in the "Repeating function elements" section.



An important note:
How does "malfunction blocked" work?

The "malfunction blocked" parameter can be set to yes or no. If a malfunction occurs either the output is switched off or the malfunction does not affect the outputs.

The **malfunction catch** is activated by linking a source on ResSM (Reset malfunction message). Only in this case is it possible to reset a malfunction message. Here a link creates a function.

HWO parameter	corresponding general operating hour parameter
LOn	Control signal
BMLu	Operating message

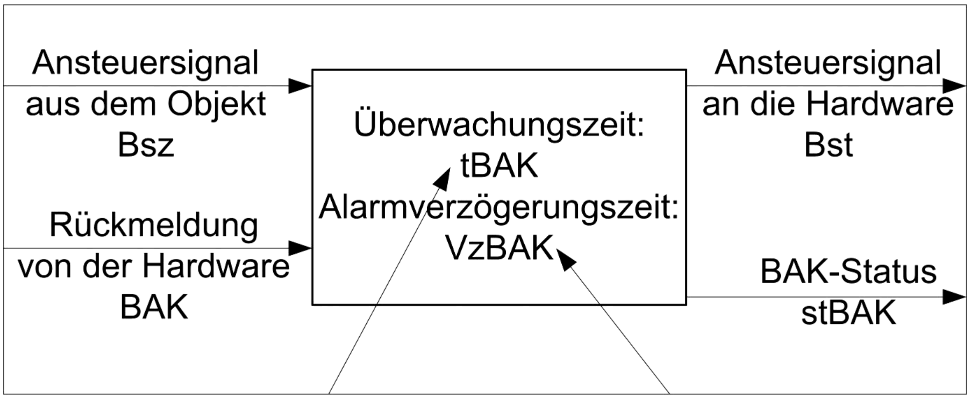
HWO parameter	corresponding general operating hour parameter
ResBh	Reset operating hours
Bh	Set operating hours
BhActive	activate
BhGw	Set limiting value
Bh	Operating hours
gBh	Limiting value exceeded

Command execution check

The function block contains a command execution check (refer to the command execution check for description and parameters) for the actual operating status: **"Operating message fan"**, Target operating status: **"Fan ON"**, output: **"Status command execution check"**:

If the actual operating status is not switched no corresponding command execution check malfunction is signaled (**stCEC**).

"Release malfunction catch" resets the command execution check malfunction.
Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general CEC parameter
LOn	Control signal from the object **Bsz**
BMLu	Acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
LOn	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

Malfunction catch / malfunction handling

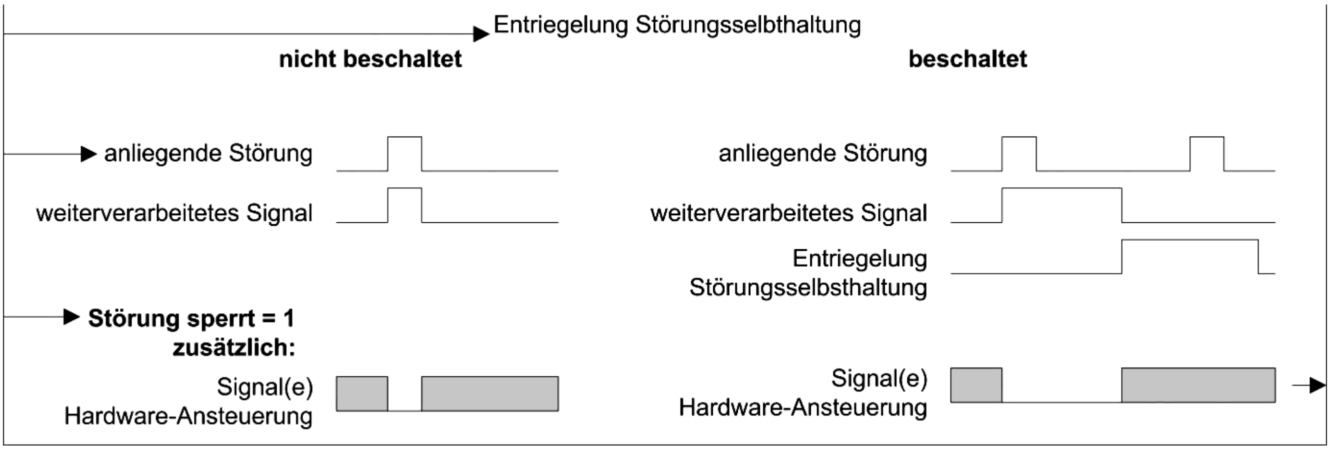
If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

An adjoining malfunction**SM** or **stCEC** may influence the control of the **"Fan ON"** output.

1. not (**"malfunction blocked"** = 0)
2. switches the outputs **"request cover"**, **"fan on"** and **"Burner on"** off (**"malfunction blocked"** = 1)

If a malfunction sets the output **"request cover"** to off, this can only be reset by activating the **"unlock malfunction catch"**.

If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM **stCEC**	Malfunction(s) occurring
StLock	Malfunction blocked
LOn	Hardware control signal

Status control/switch priorities

The following input parameters influence the control of the outputs:
AnfAuto, Z(on/off), DOL, manual(on/off), Zw(on/off), SM

Priority	Parameter / Value	Impact
Highest	**SM**	Refer to "Trouble-shooting" section
	Manual/open, Zw/open, Rep	**AnfKl** = 0, **LOn** = 0, **reg** = 0

Priority	Parameter / Value	Impact
	Manual/open, Zw/open	**AnfKl** = 1
	Z/closed, DOL	**AnfKl** = 0, **LOn** = 0, **reg** = 0
	Z/On	**AnfKl** = 1
lowest	**Auto**	Automatic operation, **"request valve"** = **AnfAuto**

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.3.19. H602 Fan 2 stage

Function summary

The "fan 2-stage" function block controls a two-stage fan or motor and supports:

- cover control during the warm-up phase / request for control
- Switching up and down the levels
- Operating hours / limiting value for each level and for both levels together
- Switching delays
- Command execution check
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, repair switch, forced control

An important note:
How does "malfunction blocked" work?

The "malfunction blocked" parameter can be set to yes or no. If a malfunction occurs either the output is switched off or the malfunction does not affect the outputs.

The **malfunction catch** is activated by linking a source on ResSM (Reset malfunction message). Only in this case is it possible to reset a malfunction message. Here a link creates a function.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**reg** Begin Control	actual value boolean	--	--	0	--
2	**AnfAuto1** Requ.Auto St.1	actual value deletable boolean	--	--	deleted	--
3	**AnfAuto2** Requ.Auto St.2	actual value deletable boolean	--	--	deleted	--
4	**AnfKl** Begin Flap	actual value boolean	--	--	0	--
5	**AnlVerz** Startup delay	set point float	0	+infinity	0	s
6	**BM1** Operating level 1	actual value deletable boolean	--	--	deleted	--
7	**BM2** Operating level 2	actual value deletable boolean	--	--	deleted	--
8	**BMKlAuf** BM Flap	actual value deletable boolean	--	--	deleted	--
9	**Bh** Bh ges.	set point float	0	+infinity	0	h

No.	name of parameter	parameter typ	min	max	init	unit
10	**BhAktiv** BHActive Y/N	set point boolean	--	--	0	--
11	**BhGw** GW Operating	set point float	0	+infinity	2000	h
12	**LEin1** Level 1	actual value boolean	--	--	0	--
13	**LEin2** Level 2	actual value boolean	--	--	0	--
14	**DBE** DBE	set point deletable boolean	--	--	deleted	--
15	**Hand** Manual switching status	actual value multistate	--	4	0	value,text 9,Auto 1,Level 1 2,Level 2 0,OFF
16	**Rep** Rep.switch	actual value deletable boolean	--	--	deleted	--
17	**ResBh** ResBh	actual value deletable boolean	--	--	deleted	--
18	**ResSM** ResSM	actual value deletable boolean	--	--	deleted	--
19	**Z** Z- influence	actual value multistate	--	4	0	value,text 9,Auto 1,Level 1 2,Level 2 0,OFF
20	**BhGw1** GW 1 Operating	set point float	0	+infinity	2000	h
21	**BhGw2** GW 2 Operating	set point float	0	+infinity	2000	h
22	**SM1** SM Level 1	actual value deletable boolean	--	--	deleted	--
23	**SM2** SM Level 2	actual value deletable boolean	--	--	deleted	--
24	**StSperr** SM blocked	set point boolean	--	--	0	--
25	**tv12** Time Hrs.1-2	set point float	0	+infinity	30	s

No.	name of parameter	parameter typ	min	max	init	unit
26	**tv21** Time Hrs.2-1	set point float	0	+infinity	30	s
27	**ResBh1** ResBh1	set point deletable boolean	--	--	deleted	--
28	**ResBh2** ResBh2	set point deletable boolean	--	--	deleted	--
29	**VzBAk1** VzBAk1	set point float	0	+infinity	0	s
30	**VzBAk2** VzBAk2	set point float	0	+infinity	0	s
31	**tBAK1** tBAK1	set point deletable float	0	+infinity	30	s
32	**tBAK2** tBAK2	set point float	0	+infinity	30	s
33	**Zw** Forced	actual value multistate	--	4	0	value,text 9,Auto 0,OFF 1,Level 1 2,Level 2
34	**Bh1** Bh Level 1	set point float	0	+infinity	0	h
35	**Bh2** Bh Level 2	set point float	0	+infinity	0	h
36	**gBh** GW Bh	actual value boolean	--	--	0	--
37	**gBh1** GW Bh1	actual value boolean	--	--	0	--
38	**gBh2** gBh2	actual value boolean	--	--	0	--
39	**stBAK1** BAK St.1	actual value boolean	--	--	0	--
40	**stBAK2** BAK.St.1	actual value deletable boolean	--	--	deleted	--
41	**SMout** SMout	actual value boolean	--	--	0	--

Function description

cover control during the warm-up phase / request for control

If the fan is to be switched on the **"cover request"** is first set to 1.
Then there is a pause for the **"operational cover open"** = 1 if this input is wired.

Then **"fan on level 1"** is set to 1 and - if connected - the plant waits for **"fan operating message"** = 1. Only then is **"request control"** set to 1.

If fan level should start the process described takes place for level 2.

"Request control" open is set to 1 when **"fan on level 1"** or **"fan on level 2"** is switched on and the operating messages. **"Request control"** also remains when switching between the levels. If the plant switches from level 1 to level 2 the plant waits for "**VzBAk2**". If the operating message for level 2 is not yet available the **"request control"** is set to "0" again.

If the output **"Fan ON level 2"** is active the output **"Fan ON level 1"** is blocked (mutual locking).

This HWO does not work with fans that have to be switched to both level 1 and level 2 at the same time.

For **"operational message cover open"** this does not include a command execution check as **"request pump / cover"** should always be linked to a "cover" hardware object that contains its own command execution check.

Switching up and down the levels

Level 2 is always switched on with a time delay (**"switching up delay"**) via level 1, i.e. level 1 must run for a **"Switching up delay time"** before level 2 is switched on. This is independent of **"warm-up delay automatic level 1"**.

If the request for level 2 is placed when level 1 has already been active longer than **"Switching up delay"** level 2 is activated immediately (**"Switching up delay"** is to be viewed as a minimum time for level 1).

Switching back from level 2 to level 1 occurs via an off phase for the **"switching down"** period.
Switching up and down the levels does not work in non-automatic modes, i.e. for Z, manual and forced.

When switching back from level 2 to level 1 the **"request control"** stays set to 1 even within the **"switching down time"**.

Switching delays

The fan can be switched on in automatic mode with a delay for each level.
If **AnfAuto1** is activated the plant first waits for **"warm-up delay automatic level 1"** before the warm-up phase starts. Then comes:
"Request cover"
"Operational message cover open"
"Fan on level 1".

If level **AnfAuto2** is activated in ongoing operation the plant first waits until the **"switching up delay"** has ended for level 1 and only then switches on **"fan on level 2"**.
If in the off status **AnfAuto2** is activated first the plant first waits for **"warm-up delay automatic level 1"** before the warm-up phase starts. Then comes:
"Request cover"
"Operational message cover open"
"Fan on level 1".
"Switching up delay" and
"Fan on level 2".
"warm-up delay automatic level 1" is only considered in automatic operation.

Operating hours / limiting value

The fan's operating hours can be counted for each level individually and also for both levels together; the operating counters can be preset and given a limiting value. If the limiting value is exceeded a message is produced. If the inputs of the fan fan operating messages are not connected, the corresponding control output **"fan on level 1"** or **"fan on level"** are used for counting.

Note: The parameter names of the operating hour counter are different from those described in the "Repeating function elements" section.

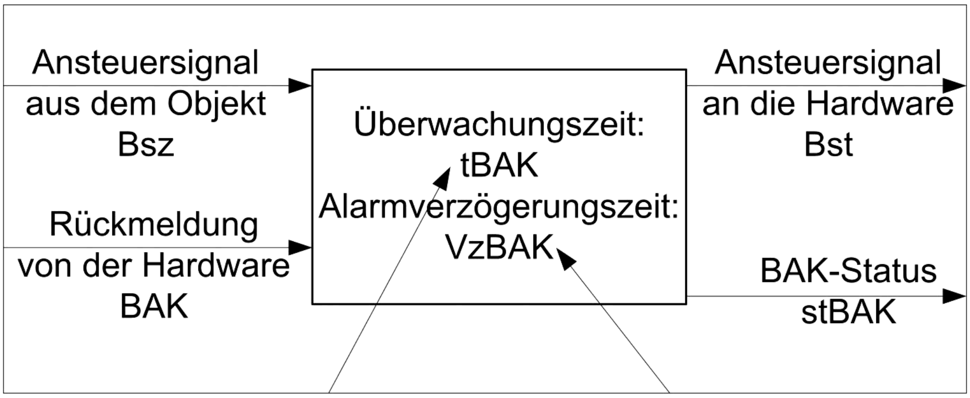
Command execution check

The function block contains command execution checks for both levels (refer to command execution check chapter for description and parameters) for the
Actual operational statuses: **"operating message fan level 1 or 2"**
Target operational statuses: **"fan ON level 1 or 2"**
Outputs: **"Status command execution check level 1 or 2"**

If the actual operating statuses are not switched, no corresponding command execution check malfunction is signaled (**stCEC level 1 or 2**).

"Release malfunction catch" resets the command execution check malfunction.

Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general CEC parameter
LOn1 or LOn2	Control signal from the object **Bsz**
BM1 or BM2	Acknowledgement from hardware **CEC**
tCEC1 or tCEC2	Monitoring time **tCEC**
VzCEC1 or VzCEC2	Alarm delay time **VzCEC**
LOn1 or LOn2	Control signal to the hardware **Bst**
stCEC1 or stCEC2	CEC status **stCEC**

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

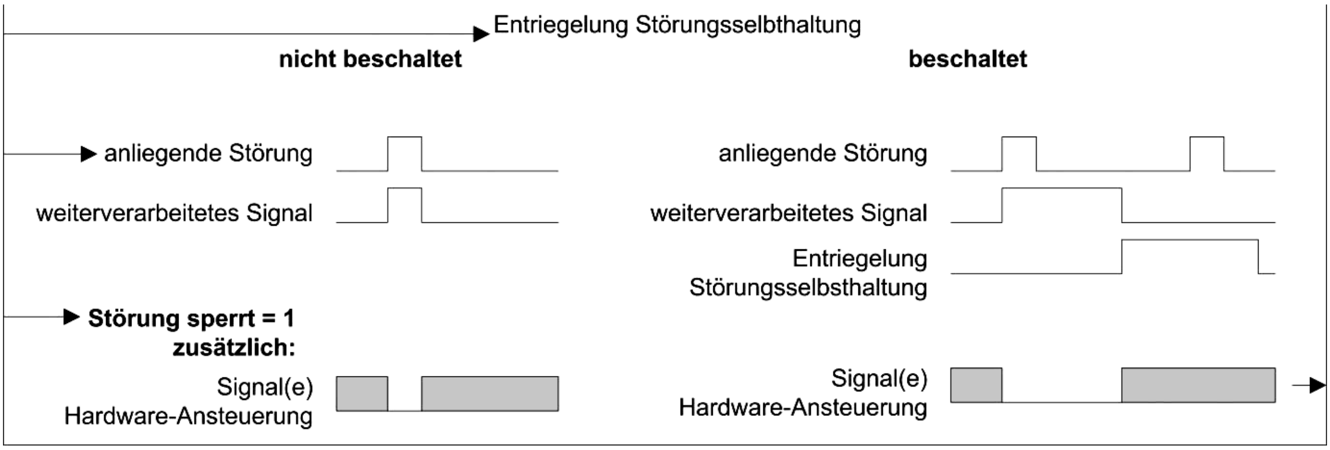
If a malfunction occurs for **"malfunction locking"** = 1 the fan is switched off completely.

A malfunction that occurs **SM1** or **SM2** or **stCEC1** or **stCEC2** may influence the control of the outputs **"Fan 1 ON level 1"** and **"Fan ON level 2"** as follows:

1. not (**"malfunction blocked"** = 0)
2. switches the outputs **"request cover"**, **"fan on level 1"**, **"fan on level 2"** and **"request control"** off immediately and completely.
   (**"malfunction blocked"** = 1)

If the malfunction switches off the outputs **"Fan ON level 1",** and **"Fan ON level 2"** this can only be reset by activating the **"release malfunction catch"**.

If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM1 and SM2 **stCEC1 and stCEC2**	Malfunction(s) occurring
StLock	Malfunction blocked
LOn1 and LOn2	Hardware control signal

Status control/switch priorities

The following input parameters influence the control of the outputs:
Z(Off/Level 1/Level 2), DOL, Manual(Off/Level 1/Level 2), Zw(Off/Level 1/Level 2), Rep, SM

Priority	Parameter / Value	Impact
Highest	**SM**	Refer to "Trouble-shooting" section
	Manual/open, Zw/open, Rep	**LOn1** = 0, **LOn2** = 0
	Manual/Level 2, Zw/Level 2	**LOn1** = 0, **LOn2** = 1
	Manual/Level 1, Zw/Level 1	**LOn1** = 1, **LOn2** = 0
	Z/closed, DOL	**LOn1** = 0, **LOn2** = 0
	Z/Level 2	**LOn1** = 0, **LOn2** = 1
	Z/Level 1	**LOn1** = 1, **LOn2** = 0
lowest	**Auto**	Automatic operation If **"request automatic operation level 1"** and **"request automatic operation level 2"** are in place level 2 is activated taking **"switching up delay"** into account.

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.3.21. H604 fan constant FC/bypass

Function summary

The "fan constant" function block controls a fan or motor with an optional bypass switch as per a set point **Ytarget** and supports:

- cover control during the warm-up phase / request for control
- Operating hours / limiting value
- Switching delays
- Command execution check
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Begin Automatic	actual value deletable boolean	--	--	deleted	--
2	**AnfKl** Begin Flap	actual value boolean	--	--	0	--
3	**AnlVerz** Start delay Automatic	set point integer	0	2147483647	0	s
4	**BM** Re: fan message	actual value deletable boolean	--	--	deleted	--
5	**BMFu** Re: message FU	actual value deletable boolean	--	--	deleted	--
6	**BMKlAuf** Re: flap OPEN message	actual value deletable boolean	--	--	deleted	--
7	**Bh** Operating hours	set point integer	0	2147483647	0	h
8	**BhAktiv** Re: Activate oper.hrs. counting	set point boolean	--	--	0	--
9	**BhGw** Oper.hrs. limit value	set point integer	0	2147483647	0	h
10	**ByAktiv** Bypass activation	set point boolean	--	--	0	--
11	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
12	**Hand** Manual switch	set point multistate	--	4	0	value,text 9,Auto 0,OFF 21,FU_ON 31,BY_ON
13	**LuBy** Fan bypass ON	actual value boolean	--	--	0	--
14	**LuFu** Fan FU ON	actual value boolean	--	--	0	--
15	**RMAna** Setting feedback FU	actual value deletable integer	0	100	deleted	%
16	**Rep** Repare switch	actual value deletable boolean	--	--	deleted	--
17	**ResBh** Reset opr. hours	actual value deletable boolean	--	--	deleted	--
18	**ResSM** Unlock malfunction catch	actual value deletable boolean	--	--	deleted	--
19	**RzByFu** Switch-back time bypass FU	set point integer	0	120	30	s
20	**SM** Fan malf.	actual value deletable boolean	--	--	deleted	--
21	**SMFu** Malfunction FU	actual value deletable boolean	--	--	deleted	--
22	**StFuBy** Malf. FU requires bypass	set point boolean	--	--	0	--
23	**StFuSper** Malf. FU blocked	set point boolean	--	--	0	--
24	**StSperr** Malf. fan blocked	set point boolean	--	--	0	--
25	**VzBAK** stBAK delayed	set point integer	0	2147483647	0	s
26	**VzBAKFu** stBAKFu delayed	set point integer	0	2147483647	0	s
27	**Y** FU Drive analog	actual value integer	0	100	0	%
28	**Ysoll** Fan setpoint	set point integer	0	100	0	%

No.	name of parameter	parameter typ	min	max	init	unit
29	**Z** Z- influence	set point multistate	--	4	0	value,text 9,Auto 0,OFF 21,FU_ON 31,BY_ON
30	**Zs** Setp. fan Z-influence	set point integer	0	100	0	%
31	**Zw** Forced control	set point multistate	--	3	0	value,text 9,Auto 0,OFF 1,ON
32	**ZwSw** Setp. forced control analog	set point integer	0	100	0	%
33	**gBh** Limit value error by opr.hrs.	actual value boolean	--	--	0	--
34	**reg** Begin Control	actual value boolean	--	--	0	--
35	**stBAK** Status BAK Fan	actual value boolean	--	--	0	--
36	**stBAKFu** Status BAK FU	actual value boolean	--	--	0	--
37	**tBAK** Time stBAK	set point integer	0	2147483647	30	s
38	**tBAKFu** Time stBAKFu	set point integer	0	2147483647	30	s
39	**SMout** SMout	actual value boolean	--	--	0	--

Function description

Bypass

The optional bypass branch secures fan operation; if a frequency converter malfunction occurs the fan runs without control in this case. The outputs **"fan FC ON"** and **"fan bypass ON"** are never active at the same time.

The bypass function is switched on or off with parameter **ByAktiv**.A source can be linked and used to consciously switch the bypass on.

cover control during the warm-up phase / request for control

If the fan is to be switched on the **"cover request"** is first set to 1.
Then there is a pause for the **"operational cover open"** = 1 if this input is wired. Then **"Fan on"** (or if nec. **"fan bypass on"**) is set to 1 and - if connected - the plant waits for **"operating message fan"** = 1. Only then is **"request control"** set to 1.

!!! For **"operational message cover open"** this does not include a command execution check as **"request pump / cover"** should always be linked to a "cover" hardware object that contains its own command execution check.

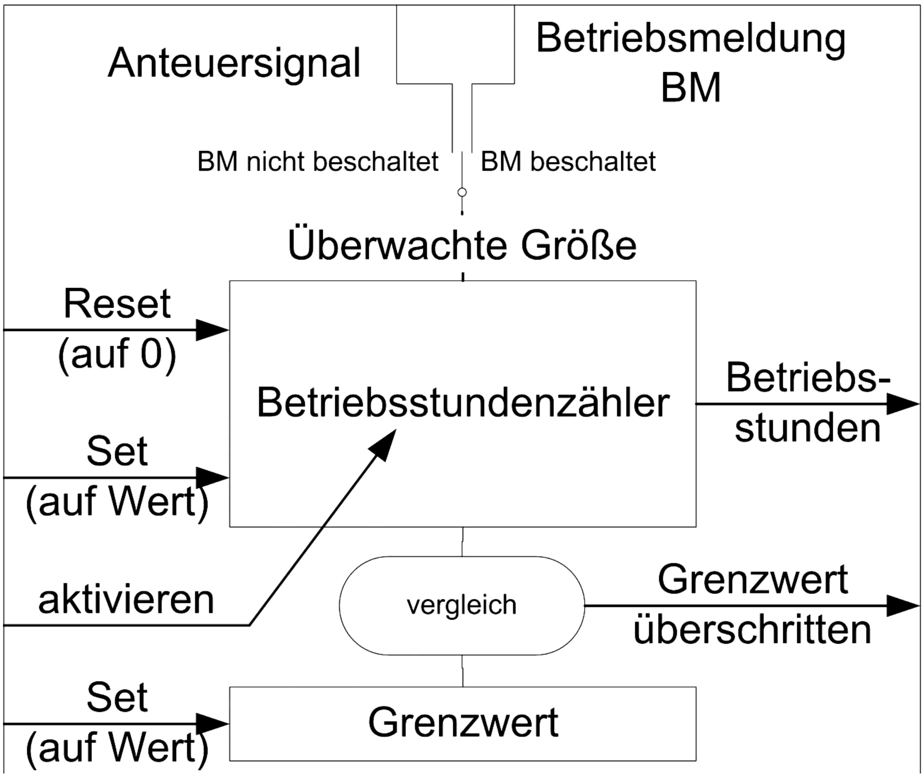
Switching delays

It is possible to delay switching on the automatic operation (**"Delay automatic start"**).

The transfer from bypass to FC operation can be equipped with a delay: **RzByFu**, this delay only works in automatic operation.

Operating hours / limiting value

The operating hours of the fan can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded a message is produced. If the input for the fan operating message is not switched the fan output is used for counting. Operating hours are counted in bypass and FC operation.



HWO parameter	corresponding general operating hour parameter
LuFu or LuBy	Control signal
BM	Operating message
ResBh	Reset operating hours
Bh	Set operating hours
BhActive	activate
BhGw	Set limiting value
Bh	Operating hours
gBh	Limiting value exceeded

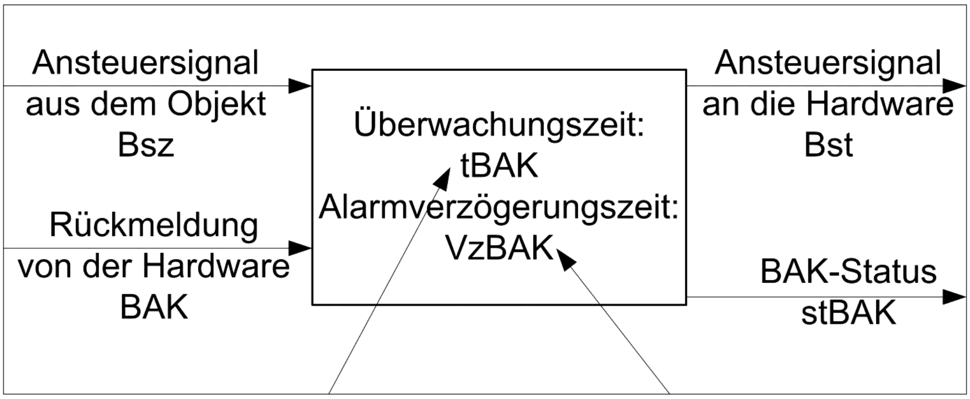
Command execution check

Command execution checks (refer to command execution check section for description and parameters) exist for

- Target operational status: **"Fan operating message"**
- Target operational status: **("Fan FC ON"** || **"Fan Bypass ON"**)
- Output: **"Status Command execution check fan"**
- Target operational status: **"FC operating message"**
- Target operational status: **"Request FC control"**
- Output: **"Status FC command execution check"**

If the actual operating statuses are not switched, no corresponding command execution check malfunction is signaled (**stCEC**or**stCECFu**).

"Release malfunction catch" resets the command execution check malfunction.



HWO parameter	corresponding general CEC parameter
LuFu and LuBy	Control signal from the object **Bsz**
BM	Acknowledgement from hardware **CEC**

HWO parameter	corresponding general CEC parameter
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
LuFu and LuBy	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

Malfunction messages that occur**SM** and **SMFu** or **stCEC** and **stCECFu** may affect the operation of the switching outputs.

1. not at all(**"malfunction blocked"** = 0)
2. if the relevant outputs are switched off or changed (**"malfunction blocked"** = 1)

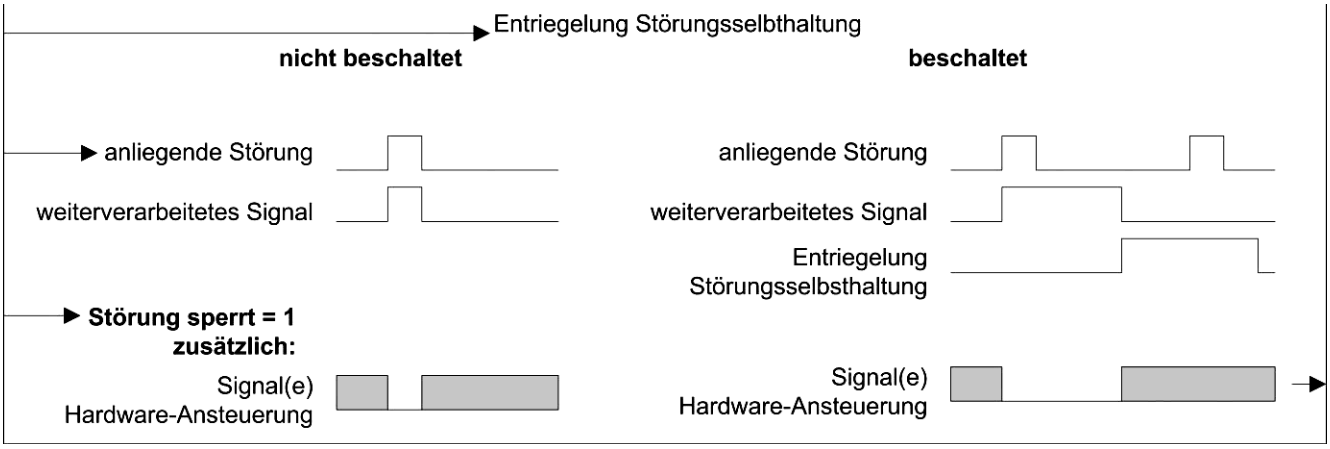
If parameter **"malfunction fan blocked"** is set any malfunction must switch off outputs **"request cover"**, **"fan FC ON"**, **"fan bypass ON"** and **"request control"**.

If the parameter **"malfunction FC blocked"** is set the output **"Fan FC ON"** is switched off.

If the parameter **"malfunction FC requires bypass"** is set the output **"fan bypass ON"** is activated when the automatic functions require the fan. In manual operation there is no automatic malfunction switch to bypass mode.

If a malfunction sets the output **"fan FC ON"** to off or bypass operation is activated, this can only be reset by activating the **"unlock malfunction catch"**.

If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM and SMFu **stCEC and stCECFu**	Malfunction(s) occurring
StLock	Malfunction blocked
AnfKl, LuFu, LuBy, reg	Hardware control signal

Status control/switch priorities

The following input parameters influence the control of the outputs:
AnfAuto, Z(off/Fu on/bypass on) and Zs, DOL, Rep, Manual(off/Fu on/bypass on), Zw(off/on) and ZwSw, Rep, SM and SMFu

Priority	Parameter / Value	Impact
Highest	**Manual/open, Zw/open, Rep**	**LuFu** = 0, **LuBy** = 0
	SM, SMFu	**Refer to "Trouble-shooting" section**
	Manual/Fu On, Z/FC On, Zw/On	**LuFu** = 1, **LuBy** = 0 **Zw/On**: if no malfunction FC (**SMFu**): **LuFu** = 1, **LuBy** = 0 otherwise **LuFu** = 0, **LuBy** = 1 **ZwSw** vs. **Zs**: if **Zw/On** and **Z/FC On** are active, **ZwSw** is used as **Y**
	Manual/Bypass on	**LuFu** = 0, **LuBy** = 1
	DOL, Z/closed	**LuFu** = 0, **LuBy** = 0
	Z/Bypass on	**LuFu** = 0, **LuBy** = 1
lowest	**AnfAuto**	if **AnfAuto** = 1, then automatic operation

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.3.22. H611 Valve open/closed

Function summary

The "valve open/closed" function block controls a valve that can be opened or closed and considers a valve run time.

The function block supports:

- Final position replication
- Command execution check
- Valve blocking protection
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Auf** End pos. OPEN	actual value deletable boolean	--	--	deleted	--
2	**Zu** End pos. SHUT	actual value deletable boolean	--	--	deleted	--
3	**AnfAuto** Begin Automatic	actual value deletable boolean	--	--	deleted	--
4	**Yr** Sevo feedback valve	actual value deletable float	0	130	deleted	%
6	**Y** Valve actuation	set point boolean	--	--	0	--
9	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--
10	**Hand** Manual influence	set point multistate	--	3	0	value,text 9,Manual Auto 1,Manual OPEN 0,Manual SHUT
14	**ResSM** Unlock malfunction catch	actual value deletable boolean	--	--	deleted	--
16	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
17	**VzBAK** StBAK delayed	set point integer	0	2147483647	0	s

No.	name of parameter	parameter typ	min	max	init	unit
18	**Z** Z- influence	set point multistate	--	3	0	value,text 9,Z-Auto 1,Z OPEN 0,Z SHUT
19	**Zw** Forced control	set point multistate	--	3	0	value,text 9,Forced Auto 1,Forced OPEN 0,Forced SHUT
21	**StzVBS** Start time blocking prot.	set point float	0	1440	720	min
22	**LzVBS** Run time blocking prot.	set point float	0	1440	5	min
24	**vbs** Blocking prot. active	actual value boolean	--	--	0	--
25	**stBAK** Status Bak	actual value boolean	--	--	0	--
26	**tBAK** TimeBAK	set point float	0	+infinity	30	s
27	**tMot** Motor runtime	set point integer	1	2147483647	120	s
30	**Stell** Setting (OPEN,SHUT,Running)	actual value multistate	--	3	1	value,text 1,OPEN 0,SHUT 24,Running
31	**SMout** SMout	actual value boolean	--	--	0	--

Final position replication

The **"final position open"**, **"final position closed"** and **"position feedback signal valve"** inputs can be wired if required.
If the **"position feedback signal valve"** is wired, but not the**"final position open"** and **"final position closed"**, both final positions are determined via the **"position feedback signal valve"**. If **"position feedback signal valve"** < 3 % a "closed" final position is assumed, if **"position feedback signal valve"** > 97 % an "open" final position is assumed, otherwise "running".
If the plant in addition to **"position feedback signal valve"**is also wired for **"final position open"** or **"final position open"** these inputs have higher priority.
If only one of the **"final position open"** or **"final position closed"** is switched but not **"position feedback signal valve"**, the final position that is not switched is determined via the **"motor operating time"**.
If e.g. only **"final position closed"** is switched after an "open" control the **"Setting"** output is first set to "running" and after the end of the **"Motor operating time"** set to "open".
If both **"final position open"** and **"final position closed"** are not switched the final position

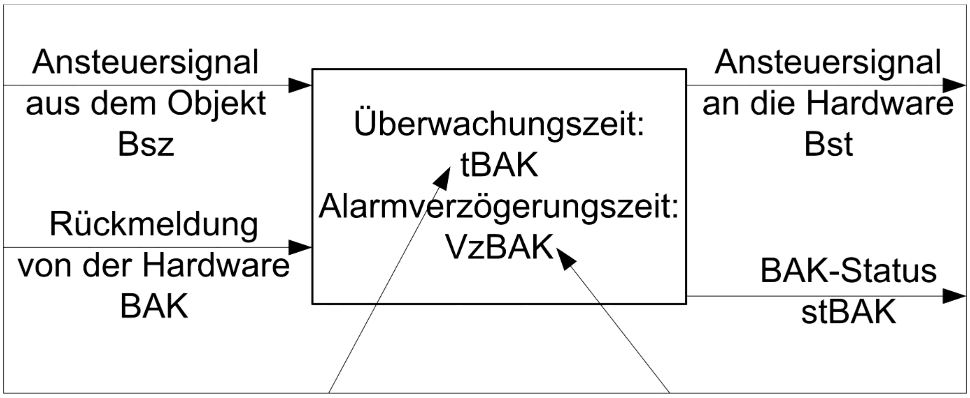
replication occurs in the same way for both final positions but a command execution check is not however effective.

Valve blocking protection

The function block includes the "valve block protection" function. If the value 0 is entered for the **LzVBS** operating time this function does not work. The valve blocking protection opens the valve if it is in automatic mode and is not open at the relevant time. At this time the **vbs** output is set to 1.

Command execution check

The function block contains a command execution check (refer to the command execution check section for description and parameters) for the actual operating status **"Setting"** that is formed as described above.
The target operating status is **"control valve"**; the output is **"Status command execution check"**.
"Release malfunction catch" resets the command execution check malfunction.
Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



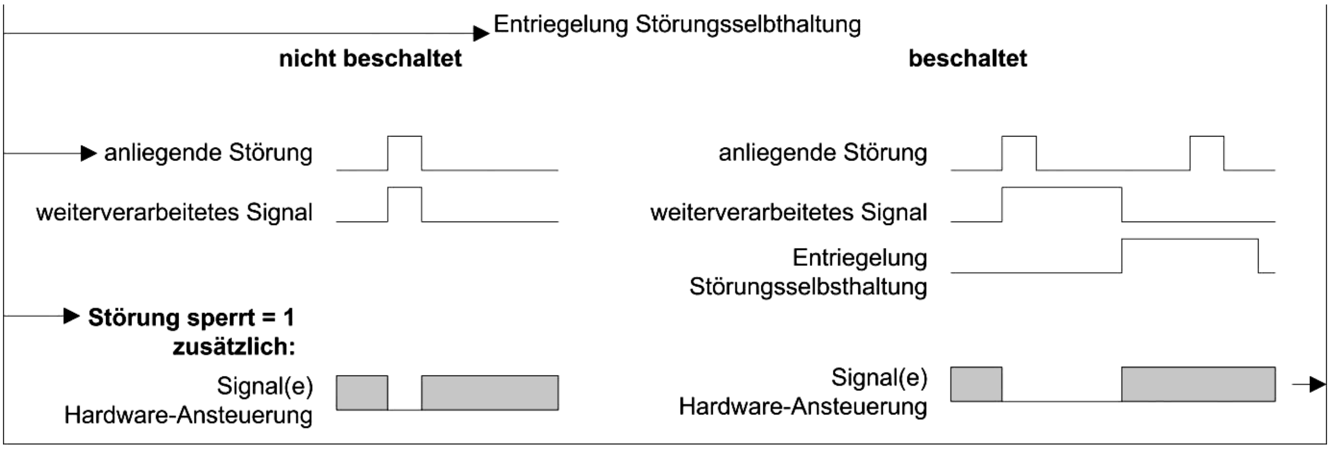
HWO parameter	corresponding general CEC parameter
Y	Control signal from the object **Bsz**
Yr	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Y	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

No input **"Valve malfunction" (SM)**.

An adjoining command execution check may optionally influence the control of the **"control valve"** output
a) not (**"Fault blocked"** = 0)
b) the output **"Control valve"** switched to "closed" (**"malfunction blocked"** = 1)
If a malfunction sets the output **"control valve"** to "closed" this can only be reset by activating the **"unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
stCEC	Malfunction(s) occurring
StLock	Malfunction blocked
Y	Hardware control signal

Switching priorities

The function block supplies an output signal **"Control valve"**. The following input parameters influence the control of this output:
AnfAuto(open/closed), Z(open/closed), DOL, Manual(open/closed), Zw(open/closed), stCEC

Priority	Parameter / Value	Action
Highest	**StCEC**	Refer to "Trouble-shooting" section
	Manual/Closed, Zw/Closed	Control valve: "closed"
	Manual/open, Zw/open	Control valve: "open"
	Z/closed, DOL	Control valve: "closed"

Priority	Parameter / Value	Action
	Z/open	Control valve: "open"
lowest	**Auto**	Automatic operation

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.3.23. H612 Valve bus drive

Function summary

The "valve bus" function block controls a constant valve with target setting of 0..100%.
The function block supports:

- Inverting position feedback signal
- Valve blocking protection
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Auf** End pos. OPEN	actual value deletable boolean	--	--	deleted	--
2	**Zu** End pos. SHUT	actual value deletable boolean	--	--	deleted	--
3	**Ysoll** Setp. valve automatic	actual value float	0	100	0	%
4	**Yr** Sevo feedback valve	actual value deletable float	0	100	deleted	%
5	**Yist** Position display	actual value float	0	100	0	%
6	**Y** Setp. setting of valve	actual value float	0	100	0	%
7	**YrInv** Inverted servo feedback	set point deletable boolean	--	--	deleted	--
9	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--
10	**Hand** Manual influence	set point deletable integer	0	100	deleted	%
12	**Rep** Rep.switch	set point deletable boolean	--	--	deleted	--
14	**ResSM** Unlock malfunction catch	actual value deletable boolean	--	--	deleted	--
15	**SM** Valve malf.	actual value deletable boolean	--	--	deleted	--
16	**StSperr** Malfunction blocked	set point boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
18	**Z** Z- influence	set point deletable integer	0	100	deleted	%
19	**Zw** Forced control	set point deletable boolean	--	--	deleted	--
20	**ZwSw** Setpoint forced control	set point integer	0	100	100	%
21	**StzVBS** VBS Start time	actual value integer	0	1440	720	min
22	**LzVBS** VBS run time	set point integer	0	1440	5	min
23	**YVBS** Setp. valve blocking prot.	set point integer	0	100	0	%
24	**vbs** Blocking prot. active	actual value boolean	--	--	0	--
25	**SMout** SMout	actual value boolean	--	--	0	--

Position display

There is a **"position display"** output. This indicates this value if the **"position feedback signal valve"** input is occupied.

!! If **"position feedback signal inverted"** is activated, the inverted value (100-Yr) is indicated by **"position feedback signal valve"**.
If this acknowledgement is not occupied the value of the **"target position valve"** is used. This may come from **"Target valve position in automatic operation"**, **"Z influence"**, **"set point forced control"** or **"manual influence"**, i.e. from the input with the highest active priority.

Valve blocking protection

The function block includes the "valve block protection" function. If the value 0 is entered for the **LzVBS** operating time this function does not work. The valve blocking protection moves the valve to the stipulated target position **YVBS** if it is in automatic mode and is not open at the relevant time. At this time the **vbs** output is set to 1. (If this function works in HWO, the VBS function programmed in MC200BUS does not start as the valve is moved within 24 hr.)

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
A malfunction that occurs **SM** may not influence the control of output**Y**

a) not (**"malfunction blocked"** = 0)
b) sets the output **Y** to 0% (**"malfunction blocked"** = 1)
If a malfunction sets the output **Y** to 0% this can only be reset by activating the **"Unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.

Switching priorities

The function block supplies an output signal **"Target setting valve"**.
The following input parameters influence the control of this output:
Y, Z, DOL, Rep, Manual, Zw and ZwSw, SM

Priority	Parameter / Value	Action
Highest	**SM**	See "effects of malfunctions on operating behavior" section.
	Rep	**Y** = 0%, valve may be set manually
	Zw	**Y** = **ZwSw**
	Manual	**Y** = **Manual**
	DOL	**Y** = 0%
	Z	**Y** = **Z**
lowest	**Auto**	**Y** = **Ytarget**

4.3.3.24. H613 Valve 3-point

Function summary

The function block supports:

- Idle zone
- Valve blocking protection
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, forced control

The "3-point valve" function block controls a 3-point valve using an analog signal (0...100%). If the value of the Y output is to be increased an OPEN pulse is created. If the Y signal is to be reduced, a CLOSE pulse is created. Independent of a set idle zone above 97% an ongoing OPEN signal and under 3% an ongoing CLOSE signal is issued.
The length of the OPEN and CLOSE pulses is calculated from the value of the change in the Y output and the motor operating times**tMotAuf** or **tMotZu**. The hardware object can be used for 3-point actuators with and without position feedback signal. If no position feedback signal is available the input values "**final position open"** or "**final position CLOSED"** are analyzed for the synchronization. When the final positions are reached (for entered sources for open and close final positions) the drive moves to "stop" until it receives a command in the opposite direction < 97% or > 3%.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Auf** End pos. OPEN	actual value deletable boolean	--	--	deleted	--
2	**Zu** End pos. SHUT	actual value deletable boolean	--	--	deleted	--
3	**Ysoll** Setp. valve automatic	actual value float	0	100	0	%
4	**Yr** Sevo feedback valve	actual value deletable float	0	100	deleted	%
5	**Yist** Position display	actual value float	0	100	0	%
6	**Y** Setp. setting of valve	actual value float	0	100	0	%
7	**YAuf** OPEN Impulse	actual value boolean	--	--	0	--
8	**YZu** CLOSED Impulse	actual value boolean	--	--	0	--
9	**DBE** Forced control	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
10	**Hand** Manual influence	set point deletable integer	0	100	deleted	%
11	**Tot** Signal change deadzone	set point integer	0	50	0	%
12	**tMotAuf** Motor runtime OPEN	set point integer	1	2147483647	120	s
13	**tMotZu** Motor runtime CLOSED	set point integer	1	2147483647	120	s
14	**ResSM** Unlock malfunction catch	actual value deletable boolean	--	--	deleted	--
15	**SM** Valve malf.	actual value deletable boolean	--	--	deleted	--
16	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
18	**Z** Z-Influence	set point deletable integer	0	100	deleted	%
19	**Zw** Forced control	set point deletable boolean	--	--	deleted	--
20	**ZwSw** Setpoint forced control	set point integer	0	100	100	%
21	**StzVBS** Start time blocking prot.	set point integer	0	1440	720	min
22	**LzVBS** Run time blocking prot.	set point integer	0	2147483647	5	min
23	**YVBS** Setp. valve blocking prot.	set point integer	0	100	100	%
24	**vbs** Blocking prot. active	actual value boolean	--	--	0	--
25	**SMout** SMout	actual value boolean	--	--	0	--

Position display

There is a **"position display"** output. This indicates this value if the **"position feedback signal valve"** input is occupied. If this acknowledgement is not occupied the value of the **"target position valve"** is used. This may come from **"Target valve position in automatic operation"**, **"Z influence"**, **"set point forced control"** or **"manual influence"**, i.e. from the input with the highest active priority.

Idle zone

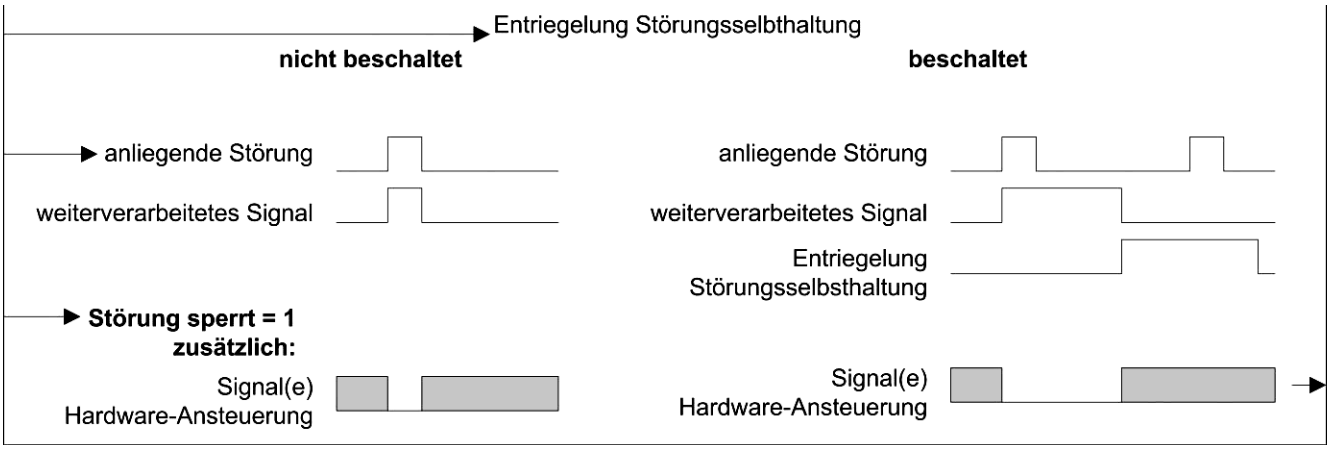
If the **"position feedback signal valve"** is not switched on the **"idle zone"** only works on control signal changes if the control signal (**Ytarget**) changes by a higher amount than the idle zone set. If **"position feedback signal valve"** is switched the idle zone works on the difference between the control signal and the position feedback signal (**Yr**). I.e. if the difference reaches a higher amount than the idle zone set, signal changes are issued.

Valve blocking protection

The function block includes the "valve block protection" function. If the value 0 is entered for the **LzVBS** operating time this function does not work. The valve blocking protection moves the valve to the stipulated target position **YVBS** if it is in automatic mode and is not open at the relevant time. At this time the **vbs** output is set to 1.

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
A malfunction that occurs **SM** may not influence the control of output**Y**
a) not (**"malfunction blocked"** = 0)
b) sets the output **Y** to 0% (**"malfunction blocked"** = 1)
If a malfunction sets the output **Y** to 0% this can only be reset by activating the **"Unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM	Malfunction(s) occurring
StLock	Malfunction blocked
Y	Hardware control signal

Switching priorities

The function block supplies an output signal **"Target setting valve"**. The following input parameters influence the control of this output:
Ytarget, Z, DOL, Manual, Zw and ZwSw, SM

Priority	Parameter / Value	Action
Highest	**SM**	See "effects of malfunctions on operating behavior" section.
	Zw	**Y** = **ZwSw**
	Manual	**Y** = **Manual**
	DOL	**Y** = 0%
	Z	**Y** = **Z**
lowest	**Auto**	**Y** = **Ytarget**

4.3.3.25. H614 Valve constant

Function summary

The "valve constant" function block controls a constant valve with target setting of 0..100%.
The function block supports:

- Valve blocking protection
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Auf** End pos. OPEN	actual value deletable boolean	--	--	deleted	--
2	**Zu** End pos. SHUT	actual value deletable boolean	--	--	deleted	--
3	**Ysoll** Yset	actual value float	0	100	0	%
4	**Yr** Servo back fan	actual value deletable float	0	100	deleted	%
5	**Yist** Setting no.	actual value float	0	100	0	%
6	**Y** Setp. valve	actual value float	0	100	0	%
9	**DBE** DBE Status	actual value deletable boolean	--	--	deleted	--
10	**Hand** Manual influence	set point deletable integer	0	100	deleted	%
14	**ResSM** Enter malf. msg	actual value deletable boolean	--	--	deleted	--
15	**SM** Valve malf.	actual value deletable boolean	--	--	deleted	--
16	**StSperr** StLock	set point boolean	--	--	0	--
18	**Z** Z- influence	set point deletable integer	0	100	deleted	%
19	**Zw** Forced control	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
20	**ZwSw** Force setpoint	set point integer	0	100	100	%
21	**StzVBS** Starttime.Blocksw	set point integer	0	1440	720	min
22	**LzVBS** Run time Blockshu	set point integer	0	2147483647	5	min
23	**YVBS** Setp. fan.block	set point integer	0	100	0	%
24	**vbs** Blocking prot. Status	actual value boolean	--	--	0	--
25	**SMout** SMout	actual value boolean	--	--	0	--

Position display

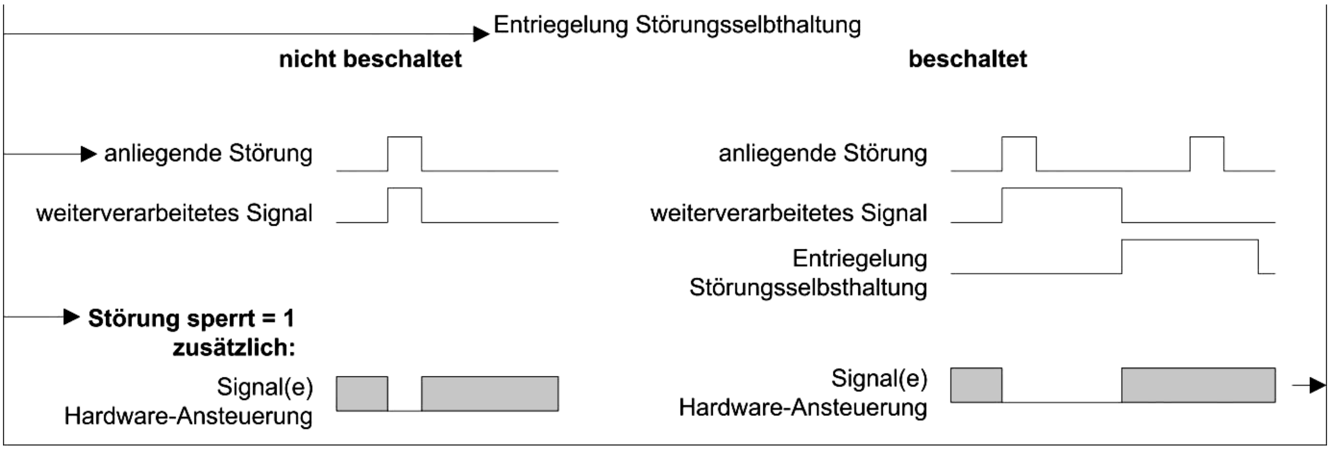
There is a **"position display"** output. This indicates this value if the **"position feedback signal valve"** input is occupied. If this acknowledgement is not occupied the value of the **"target position valve"** is used. This may come from **"Target valve position in automatic operation"**, **"Z influence"**, **"set point forced control"** or **"manual influence"**, i.e. from the input with the highest active priority.

Valve blocking protection

The function block includes the "valve block protection" function. If the value 0 is entered for the **LzVBS** operating time this function does not work. The valve blocking protection moves the valve to the stipulated target position **YVBS** if it is in automatic mode and is not open at the relevant time. At this time the **vbs** output is set to 1.

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
A malfunction that occurs **SM** may not influence the control of output**Y**
a) not (**"malfunction blocked"** = 0)
b) sets the output **Y** to 0% (**"malfunction blocked"** = 1)
If a malfunction sets the output **Y** to 0% this can only be reset by activating the **"Unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM	Malfunction(s) occurring
StLock	Malfunction blocked
Y	Hardware control signal

Switching priorities

The function block supplies an output signal **"Target setting valve"**. The following input parameters influence the control of this output:
Ytarget, Z, DOL, Manual, Zw and ZwSw, SM

Priority	Parameter / Value	Action
Highest	**SM**	See "effects of malfunctions on operating behavior" section.
	Zw	**Y** = **ZwSw**
	Manual	**Y** = **Manual**
	DOL	**Y** = 0%
	Z	**Y** = **Z**
lowest	**Auto**	**Y** = **Ytarget**

4.3.3.26. H701 Burner single stage

Function summary

The "burner single stage" function block controls a single-stage burner and supports:
pump and cover control during the warm-up phase / request for control
Chimney sweep function
Operating hours / limiting value
Switching delays
Command execution check
Malfunction catch / malfunction handling
Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Begin Automatic	actual value deletable boolean	--	--	deleted	--
2	**AnfBrEin** Begin Burner ON	actual value deletable boolean	--	--	deleted	--
3	**AnfPK** Begin Pump / Flap	actual value boolean	--	--	0	--
4	**AnlVerz** Start delay Automatic	set point integer	0	2147483647	0	s
5	**BMBr** on burner message	actual value deletable boolean	--	--	deleted	--
6	**BMPuKl** on pump/flap message	actual value deletable boolean	--	--	deleted	--
7	**Bh** Operating hours	set point integer	0	2147483647	0	h
8	**BhAktiv** Oper.hrs. of activation	set point boolean	--	--	0	--
9	**BhGw** Oper.hrs. limit value	set point integer	0	2147483647	0	h
10	**BrEin** Burner ON	actual value boolean	--	--	0	--
11	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--
12	**Hand** Manual switch	set point multistate	--	3	0	value,text 9,Auto 0,OFF 1,ON

No.	name of parameter	parameter typ	min	max	init	unit
13	**Rep** Repare switch	actual value deletable boolean	--	--	deleted	--
14	**ResBh** Reset opr. hours	actual value deletable boolean	--	--	deleted	--
15	**ResSM** release malf. self-holding	actual value deletable boolean	--	--	deleted	--
16	**SF** Chimneysweep function	set point deletable boolean	--	--	deleted	--
17	**SFZeit** Continuous chimneysweep function	set point integer	0	300	30	min
18	**SFaktiv** Chimneysweep function is active	actual value boolean	--	--	0	--
19	**SM** Burner malfunction	actual value deletable boolean	--	--	deleted	--
20	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
21	**VzBAK** stBAK delayed	actual value integer	0	2147483647	0	s
22	**Z** Z- influence	set point multistate	--	3	0	value,text 9,Auto 0,OFF 1,ON
23	**Zw** Forced control	set point multistate	--	3	0	value,text 9,Auto 0,OFF 1,ON
24	**gBh** Limit value error by opr.hrs.	actual value boolean	--	--	0	--
25	**reg** Begin Control	actual value boolean	--	--	0	--
26	**stBAK** Status BAK Burner	actual value boolean	--	--	0	--
27	**tBAK** Time BAK	set point integer	0	2147483647	30	s
28	**SMout** SMout	actual value boolean	--	--	0	--

pump and cover control during the warm-up phase / request for control

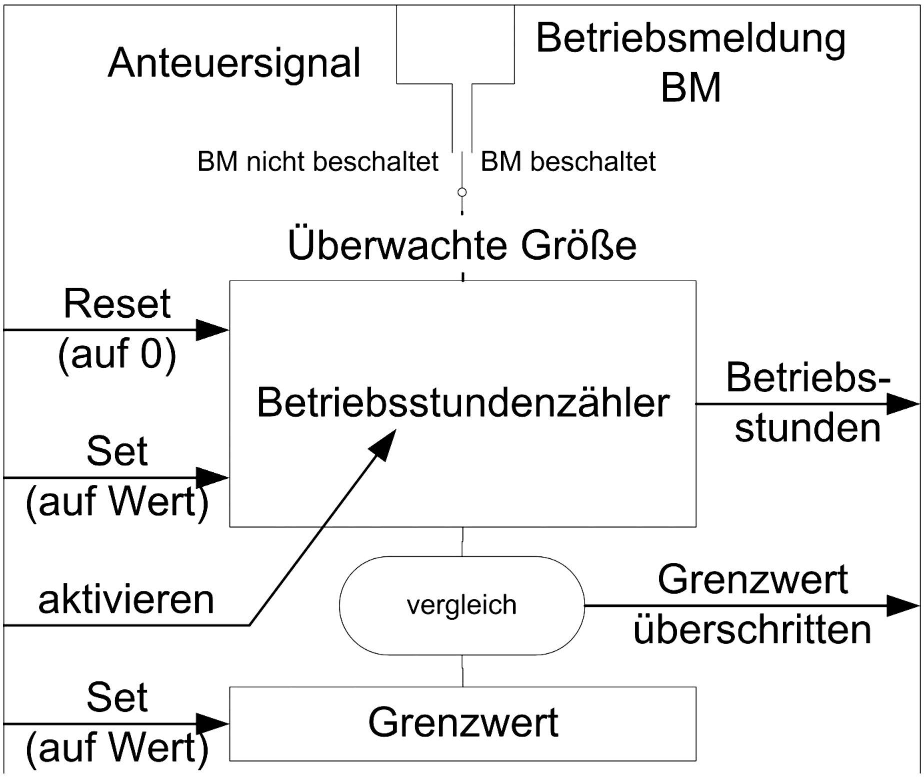
If the burner is to be switched on the **"pump/cover request"** is first set to 1.
Then there is a pause for the **"operational message pump/cover"** = 1 if this input is wired.
At the same time as **"request pump/cover"** the **"request control"** is set to 1. This signals the subsequent control beyond the hardware object that the burner is standing by to produce heat. If then the signal **"request burner on"** is set to 1 by the control and **"operational message pump / cover"** =1, the burner is switched on (**"burner on"**=1).
For **"operational message pump/cover"** this does not include a command execution check as **"request pump / cover"** should always be linked to a "pump" or "cover" hardware object that contains its own command execution check.

Chimney sweep function

The chimney sweep function switches the burner on for the**"chimney sweep function time span"** if the burner is in automatic mode and is not already switched on.
If the burner is in automatic mode and already switched on the plant ensures that the burner stays on for the **"chimney sweep function time span"**, even if the **"request automatic operation"** is set to 0 in this time.
When the chimney sweep function is activated the **"chimney sweep function active"** parameter is set to 1.

Operating hours / limiting value

The operating hours of the burner can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded a message is produced. If the input for the burner operating message is not switched the control output "**burner on"** is used for counting.
Note: The parameter names of the operating hour counter are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general operating hour parameter
BrOn	Control signal
BMBr	Operating message
ResBh	Reset operating hours
Bh	Set operating hours
BhActive	activate
BhGw	Set limiting value
Bh	Operating hours
gBh	Limiting value exceeded

Switching delays

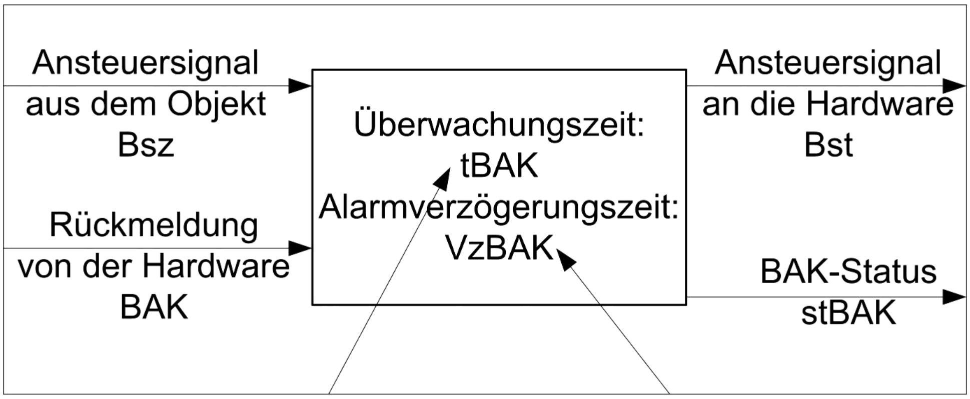
It is possible to delay switching on the automatic operation (**"Delay automatic start"**).

The **Auto** request must always be switched on.

Command execution check

The function block contains a command execution check (refer to the command execution check for description and parameters) for the actual operating status: **"Operating message burner"**, Target operating status: **"Burner on"**, output: **"Status command execution check"**:

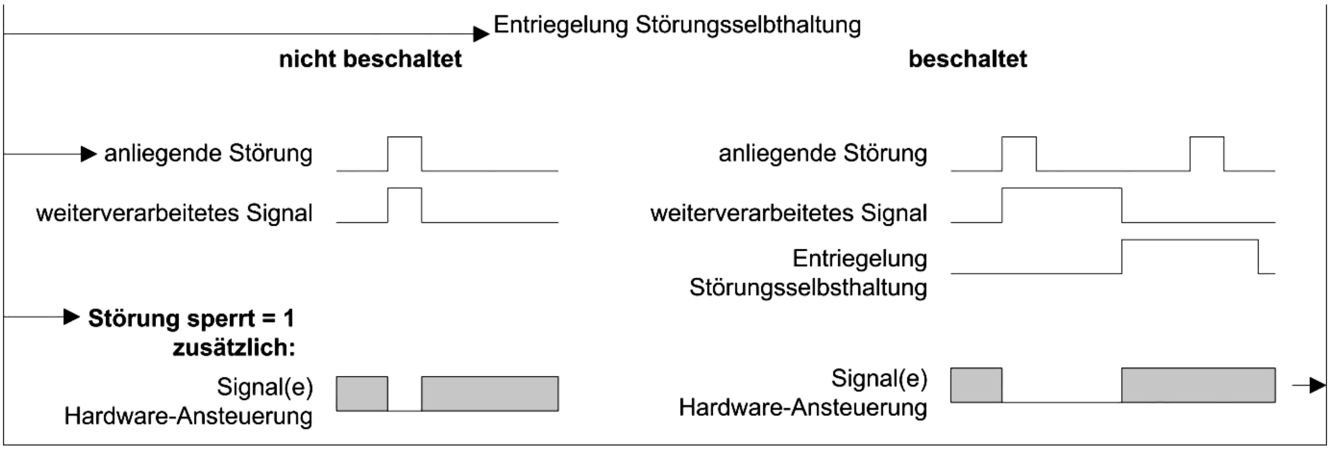
If the actual operating status is not switched no corresponding command execution check malfunction is signaled (**stCEC**).
"Release malfunction catch" resets the command execution check malfunction.
Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general CEC parameter
BrOn	Control signal from the object **Bsz**
BMbr	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Y	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
A malfunction that occurs **SM** or **stCEC** may not influence the control of outputs.
a) not (**"malfunction blocked"** = 0)
b) switches the outputs **"request pump / cover"**, **"request control"** and **"burner on"** off (**"malfunction blocked"** = 1)
If a malfunction sets the outputs to off, this can only be reset by activating the **"unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM **stCEC**	Malfunction(s) occurring
StLock	Malfunction blocked
AnfPK **reg** **BrOn**	Hardware control signal

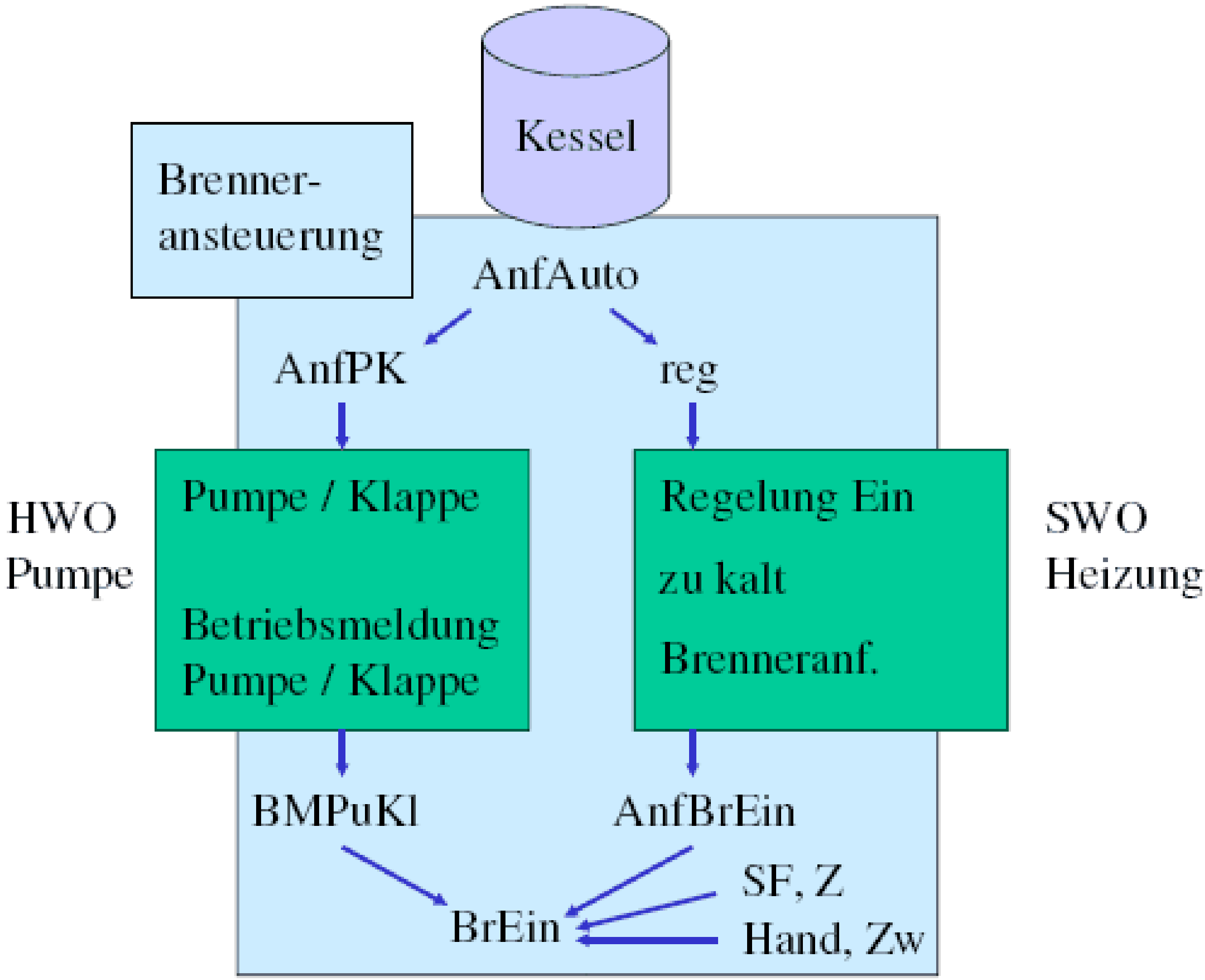
Status control/switch priorities

The following input parameters influence the control of the outputs:
AnfAuto, Z(on/off), DOL, manual(on/off), Zw(on/off), SM

Parameter / Value	Impact
Highest priority	
SM	Refer to "Trouble-shooting" section
Manual/open, Zw/open, Rep	**"Request pump / cover"** = 0 **"Request regulation"** = 0 **"Burner on"**== 0
Manual/open, Zw/open	**"Request pump / cover"** = 1 **"Request regulation"** = 1 if nec. **"Burner on"**== 1
Z/closed, DOL	**"Request pump / cover"** = 0 **"Request regulation"** = 0 **"Burner on"**== 0
Z/On, chimney sweeping function	**"Request pump / cover"** = 1 **"Request regulation"** = 1 if nec. **"Burner on"**== 1

Parameter / Value	Impact
Auto	Automatic operation, **"request pump / cover"** = **AnfAuto**
Lowest priority	

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.



4.3.3.27. H702 Burner 2 stage

Function summary

The "burner 2 stage" function block controls a two-stage burner and supports:
pump and cover control during the warm-up phase / request for control
Chimney sweep function
Operating hours / limiting value
Switching delays
Command execution check
Malfunction catch / malfunction handling
Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Begin Automatic	actual value deletable boolean	--	--	deleted	--
2	**AnfBr1** Begin Burner level 1 ON	set point deletable boolean	--	--	deleted	--
3	**AnfBr2** Begin Burner level 2 ON	set point deletable boolean	--	--	deleted	--
4	**AnfPK** Begin Pump / Flap	actual value boolean	--	--	0	--
5	**AnlVerz** Start delay Automatic	set point integer	0	2147483647	0	s
6	**BMBr1** Oper. msg burner level 1	actual value deletable boolean	--	--	deleted	--
7	**BMBr2** Oper. msg burner level 2	actual value deletable boolean	--	--	deleted	--
8	**BMPuKl** Oper. msg pump/flap	actual value deletable boolean	--	--	deleted	--
9	**Bh** Operating hours	set point integer	0	2147483647	0	h
10	**BhAktiv** Re: Activate oper.hrs. counting	set point boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
11	**BhGw** Oper.hrs. limit value	set point integer	0	2147483647	0	h
12	**Br1Ein** Burner level 1 ON	actual value boolean	--	--	0	--
13	**Br2Ein** Burner level 2 ON	actual value boolean	--	--	0	--
14	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--
15	**Hand** Manual switch	set point multistate	--	4	0	value,text 9,Manual Auto 0,Manual OFF 1,Manual level 1 2,Manual level 2
16	**Rep** Repare switch	actual value deletable boolean	--	--	deleted	--
17	**ResBh** Reset opr. hours	actual value deletable boolean	--	--	deleted	--
18	**ResSM** Unlock Malfunction catch	actual value deletable boolean	--	--	deleted	--
19	**SF** Chimneysweep function	set point deletable boolean	--	--	deleted	--
20	**SFZeit** Continuous chimneysweep function	set point integer	0	300	30	min
21	**SFaktiv** Chimneysweep function is active	actual value boolean	--	--	0	--
22	**SM1** Malf. burner level 1	actual value deletable boolean	--	--	deleted	--
23	**SM2** Malf. burner level 2	actual value deletable boolean	--	--	deleted	--
24	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
25	**Verz12** Delay level 1 - level 2	set point integer	0	2147483647	0	min

No.	name of parameter	parameter typ	min	max	init	unit
26	**VzBAK** stBAK1 or stBAK2 delayed	set point integer	0	2147483647	0	s
27	**Z** Z- influence	set point multistate	--	4	0	value,text 9,Z-Auto 0,Z Manual OFF 1,Z-Level 1 2,Z/Level 2
28	**Zw** Forced control	set point multistate	--	4	0	value,text 9,Zw Auto 0,Zw OFF 1,Zw Level 1 2,Zw Level 2
29	**gBh** Limit value error by opr.hrs.	actual value boolean	--	--	0	--
30	**reg** Begin Control	actual value boolean	--	--	0	--
31	**stBAK1** Status BAK burner level 1	actual value boolean	--	--	0	--
32	**stBAK2** Status BAK burner level 2	actual value boolean	--	--	0	--
33	**tBAK** Time BAK	set point integer	0	2147483647	30	s
34	**SMout** SMout	actual value boolean	--	--	0	--

Function description

The **Auto** request must always be switched on.

Burner level 2 always follows burner level 1, burner level 2 is never activated without burner level 1. A **"request burner level 2 on"** before a **"request burner level 1 on"** first activates burner level 1. The plant delay "**Verz12**" is only included in automatic operation. In all other cases level 2 is switched immediately.

Pump and cover control during the warm-up phase / request for control

If the burner is to be switched on the **"pump/cover request"** is first set to 1.
Then there is a pause for the **"operational message pump/cover"** = 1 if this input is wired.
At the same time as **"request pump/cover"** the **"request control"** is set to 1. This signals the subsequent control beyond the hardware object that the burner is standing by to produce heat. If then the signal **"request burner level 1 on"** is set to 1 by the control and **"operational message pump / cover"** =1, the burner 1 is switched on (**"burner level 1 on"**=1).
For **"operational message pump/cover"** this does not include a command execution check as

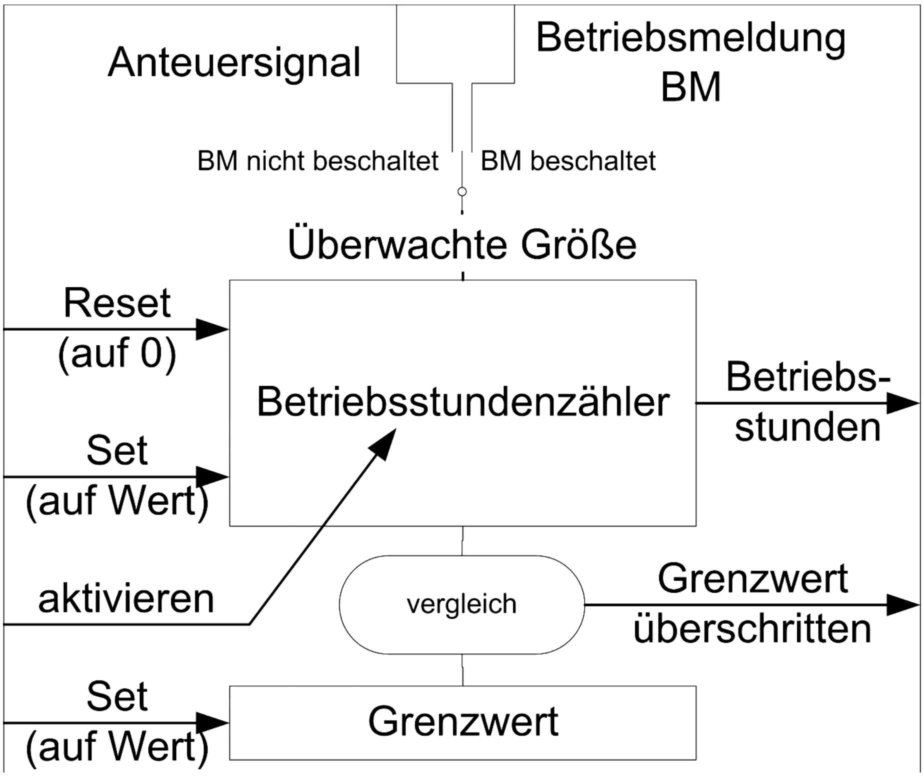
"request pump / cover" should always be linked to a "pump" or "cover" hardware object that contains its own command execution check.

Chimney sweep function

The chimney sweep function switches on burner level 1 and 2 for the **"chimney sweep function time span"** when the burner is automatic mode.
If the burner is in automatic mode and already switched on the plant ensures that the burner stays on for the **"chimney sweep function time span"**, even if the **"request automatic operation"** is set to 0 in this time.
When the chimney sweep function is activated the **"chimney sweep function active"** parameter is set to 1.

Operating hours / limiting value

The operating hours of burner level 1 can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded a message is produced. If the input for the burner operating message is not switched the control output "**burner 1 on"** is used for counting.
Note: The parameter names of the operating hour counter are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general operating hour parameter
Br1On	Control signal
BMBr	Operating message

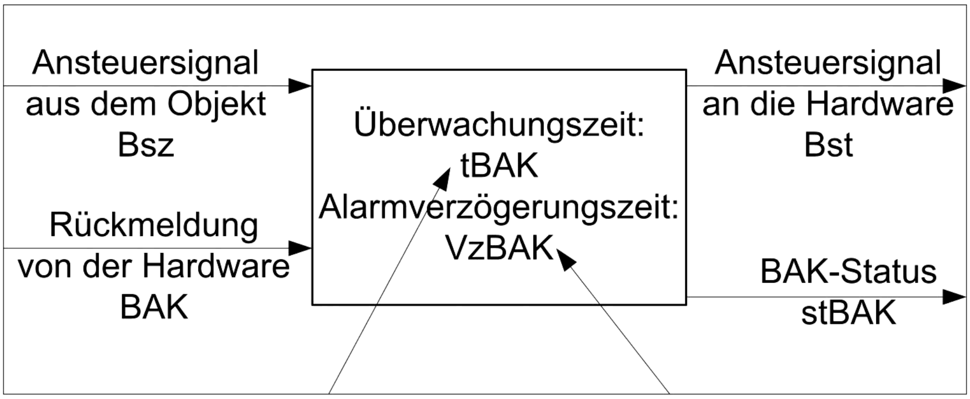
HWO parameter	corresponding general operating hour parameter
ResBh	Reset operating hours
Bh	Set operating hours
BhActive	activate
BhGw	Set limiting value
Bh	Operating hours
gBh	Limiting value exceeded

Switching delays

It is possible to delay switching on the automatic operation (**"Delay automatic start"**).
In automatic mode burner level 2 is only activated after a minimum time at level 1 (**"Delay Level 1 -> Level 2"**).

Command execution check

The function block contains a command execution check (refer to the command execution check for description and parameters) for the actual operating status for both burner levels: **"Operating message burner 2 or 2"**, Target operating status: **"Burner 1 or 2 on"**, output: **"Status command execution check 1 or 2"**.
If the actual operating status is not switched no corresponding command execution check malfunction is signaled.
"Release malfunction catch" resets the command execution check malfunction.
Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.

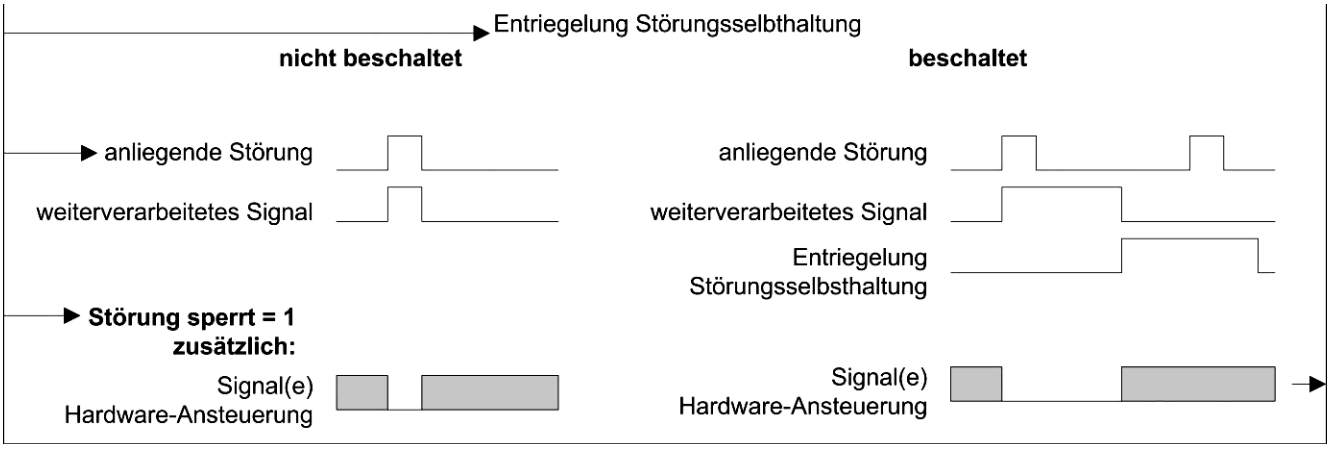


HWO parameter	corresponding general CEC parameter
Br1On or Br2On	Control signal from the object **Bsz**
BMBr1 or BMBr2	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**

HWO parameter	corresponding general CEC parameter
VzCEC	Alarm delay time **VzCEC**
Br1On and Br2On	Control signal to the hardware **Bst**
stCEC1 or stCEC2	CEC status **stCEC**

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
A malfunction that occurs **SM1** and **SM2** or **stCEC1** and **stCEC2** may affect the output control.
a) not (**"malfunction blocked"** = 0)
b) switches the outputs **"request pump / cover"**, **"request control"** and **"Burner 1 on"** and (**"Burner 2 on"**.
(**"malfunction blocked"** = 1)
If a malfunction sets the outputs to off, this can only be reset by activating the **"unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



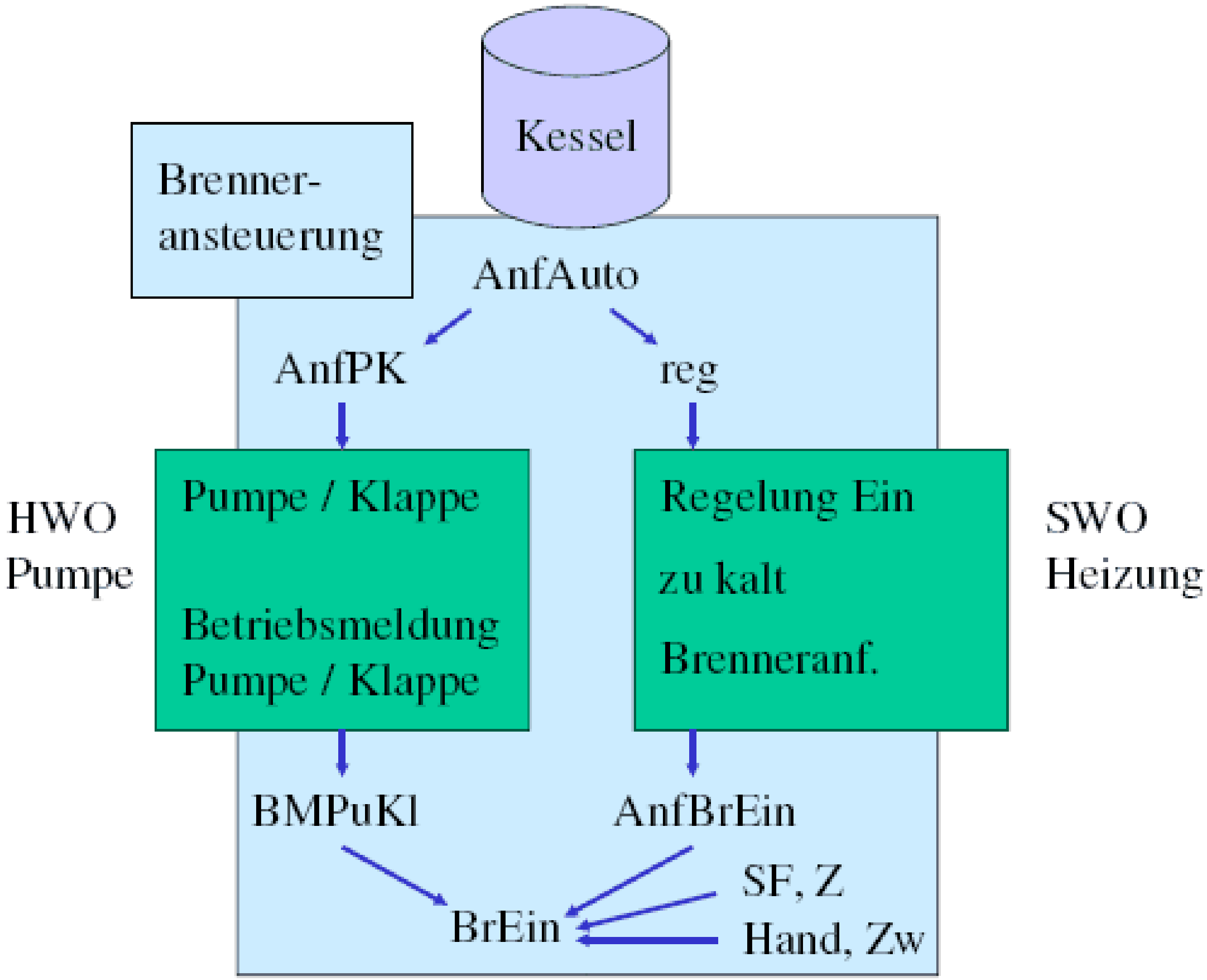
HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM1 and SM2 **stCEC1 and stCEC2**	Malfunction(s) occurring
StLock	Malfunction blocked
AnfPK **reg** **Br1On** **Br2On**	Hardware control signal

Status control/switch priorities

The following input parameters influence the control of the outputs:
AnfAuto, Z(Off/Level 1/Level 2), DOL, Manual(Off/Level 1/Level 2), Zw(Off/Level 1/Level 2), SM1 and SM2

Parameter / Value	Impact
Highest priority	
SM1, SM2	Refer to "Trouble-shooting" section
Manual/open, Zw/open, Rep	**"Request pump / cover" = 0** **"Request regulation" = 0** **"Burner level 1 on"= 0** **"Burner level 2 on"= 0**
Manual/Level 2, Zw/Level 2	**"Request pump / cover"** = 1 **"Request regulation"** = 1 If nec activate burner level 1 and level 2 (without **Delay12**)
Manual/Level 1, Zw/Level 1	**"Request pump / cover"** = 1 **"Request regulation"** = 1 if nec. activate burner level 1
Z/closed, DOL	**"Request pump / cover"** = 0 **"Request regulation"** = 0 **"Burner level 1 on"**= 0 **"Burner level 2 on"**= 0
Z/Level 2, chimney sweeping function	**"Request pump / cover"** = 1 **"Request regulation"** = 1 Activate burner level 1 and level 2 (without **Delay12**)
Z/Level 1	**"Request pump / cover"** = 1 **"Request regulation"** = 1 if nec. activate burner level 1
Auto	Automatic operation, **"request pump / cover"** = **AnfAuto**
Lowest priority	

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.


Kessel
Brenner-
ansteuerung
AnfAuto
AnfPK
reg
HWO
Pumpe
Pumpe / Klappe
Betriebsmeldung
Pumpe / Klappe
Regelung Ein
zu kalt
Brenneranf.
SWO
Heizung
BMPuKl
AnfBrEin
SF, Z
BrEin
Hand, Zw

4.3.3.28. H703 Burner modulating 3 point

Function summary

The "burner modulating" function block controls a modulating burner using 3-point control
The implementation of the analog setting signal (0..100 %) in the 3-point control is described at "3-point valve".
The inputs **"final position open"** and **"final position closed"** are not available in the "burner modulating" function block, therefore there is no synchronization using these final positions.
The function block supports:

- pump and cover control during the warm-up phase / request for control
- Chimney sweep function
- Operating hours / limiting value
- Switching delays
- Command execution check
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Begin Automatic	actual value deletable boolean	--	--	deleted	--
2	**AnfBrEin** Begin Burner ON	actual value deletable boolean	--	--	deleted	--
3	**AnfPK** Begin Pump / Flap	actual value boolean	--	--	0	--
4	**AnlVerz** Startup delay of the automatic	set point integer	0	2147483647	0	s
5	**BMBr** Burner plant message	actual value deletable boolean	--	--	deleted	--
6	**BMPuKl** Operation pump(s)/flaps	actual value deletable boolean	--	--	deleted	--
7	**Bh** Operating hours	set point integer	0	2147483647	0	h
8	**BhAktiv** Oper.hrs. of activation	set point boolean	--	--	0	--
9	**BhGw** Oper.hrs. limit value	set point integer	0	2147483647	2000	h
10	**BrEin** Burner ON	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
11	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--
12	**Hand** Manual influence	set point deletable float	0	100	deleted	%
13	**Rep** Repair switch	actual value deletable boolean	--	--	deleted	--
14	**ResBh** Reset opr. hours	actual value deletable boolean	--	--	deleted	--
15	**ResSM** Unlock malfunction catch	actual value deletable boolean	--	--	deleted	--
16	**SF** Chimneysweep function	set point deletable boolean	--	--	deleted	--
17	**SFZeit** Continuous chimneysweep function	set point integer	0	300	30	min
18	**SFaktiv** Cimneysweep function is active	actual value boolean	--	--	0	--
19	**SM** Burner malfunction	actual value deletable boolean	--	--	deleted	--
20	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
21	**Tot** Signal change deadzone	set point integer	0	50	0	%
22	**VzBAK** stBAK delayed	set point integer	0	2147483647	0	s
23	**Y** Burner setp. setting	actual value float	0	100	0	%
24	**YAuf** OPEN Impulse	actual value boolean	--	--	0	--
25	**YZu** CLOSED Impulse	actual value boolean	--	--	0	--
26	**Yist** Position display	actual value float	0	100	0	%
27	**Yr** Burner setting feedback	actual value deletable float	0	100	deleted	%
28	**Ysoll** Setp burner automatic	set point float	0	100	0	%
29	**Z** Z- influence	set point deletable float	0	100	deleted	%

No.	name of parameter	parameter typ	min	max	init	unit
30	**Zw** Forced control	set point deletable boolean	--	--	deleted	--
31	**ZwSw** Setp. valve forced control	set point deletable float	0	100	deleted	%
32	**gBh** Limit value error by opr.hrs.	actual value boolean	--	--	0	--
33	**reg** Begin Control	actual value boolean	--	--	0	--
34	**stBAK** Status BAK Burner	actual value boolean	--	--	0	--
35	**tBAK** Time BAK	set point integer	0	2147483647	30	s
36	**tMotAuf** Motor runtime OPEN	set point integer	1	2147483647	120	s
37	**tMotZu** Motor runtime CLOSED	set point integer	1	2147483647	120	s
38	**SMout** SMout	actual value boolean	--	--	0	--

Function description

There is a **"position display"** output. This indicates this value if the **"position feedback signal burner"** input is occupied. If this acknowledgement is not occupied the value of the **"target position burner"** is used. This may come from **"Target burner position in automatic operation"**, **"Z influence"**, **"set point forced control"** or **"manual influence"**, i.e. from the input with the highest active priority.

Pump and cover control during the warm-up phase / request for control

If the burner is to be switched on the **"pump/cover request"** is first set to 1.
Then there is a pause for the **"operational message pump/cover"** = 1 if this input is wired.
At the same time as **"request pump/cover"** the **"request control"** is set to 1. This signals the subsequent control beyond the hardware object that the burner is standing by to produce heat. If then the signal **"request burner on"** is set to 1 by the control and **"operational message pump / cover"** =1, the burner is switched on (**"burner on"**=1).

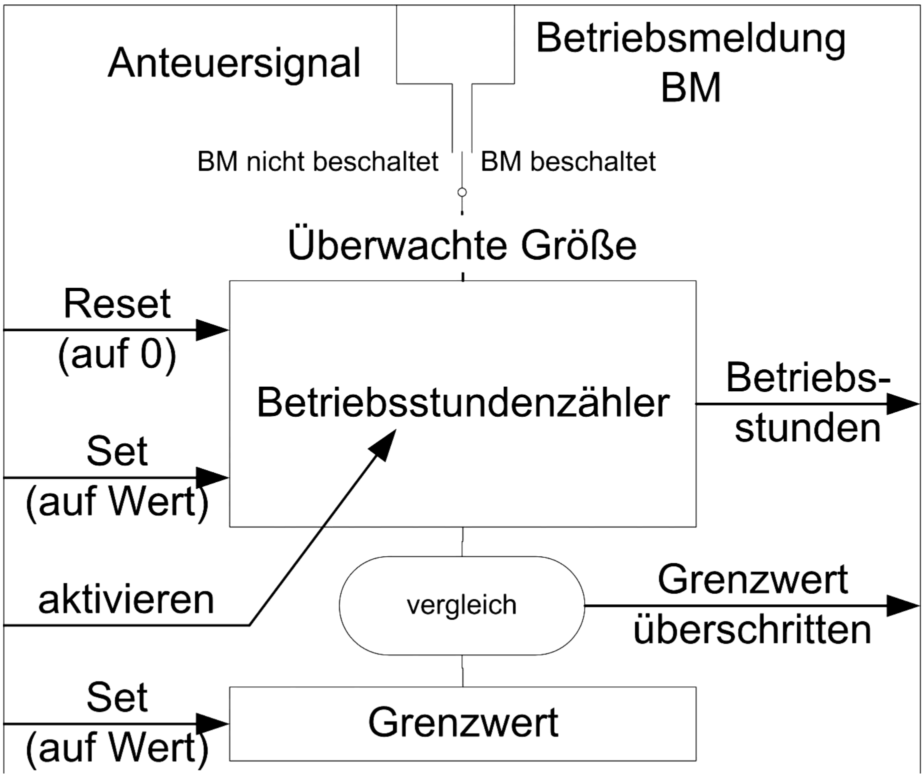
For **"operational message pump/cover"** this does not include a command execution check as **"request pump / cover"** should always be linked to a "pump" or "cover" hardware object that contains its own command execution check.

Chimney sweep function

The chimney sweep function switches the burner on for the**"chimney sweep function time span"** if the burner is in automatic mode and is not already switched on.
If the burner is in automatic mode and already switched on the plant ensures that the burner stays on for the **"chimney sweep function time span"**, even if the **"request automatic operation"** is set to 0 in this time. Here the Y signal goes to 100%.
When the chimney sweep function is activated the **"chimney sweep function active"** parameter is set to 1.

Operating hours / limiting value

The operating hours of the burner can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded a message is produced. If the input for the burner operating message is not switched the control output "**burner on"** is used for counting.
Note: The parameter names of the operating hour counter are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general operating hour parameter
BrOn	Control signal
BMBr	Operating message
ResBh	Reset operating hours
Bh	Set operating hours
BhActive	activate

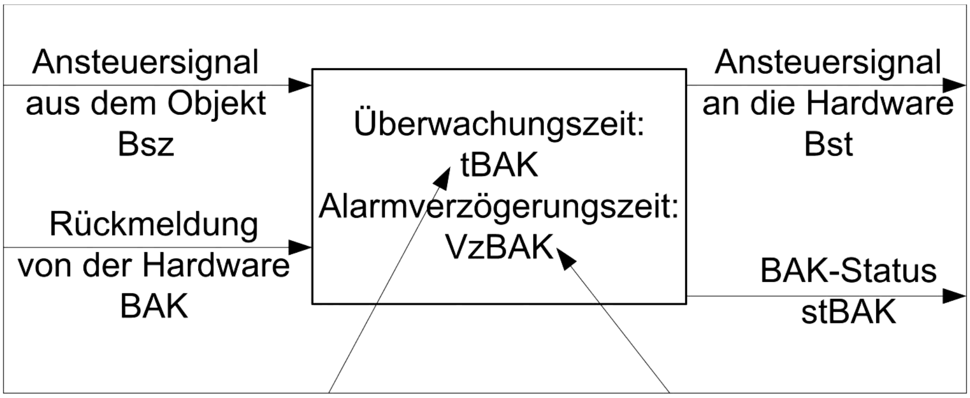
HWO parameter	corresponding general operating hour parameter
BhGw	Set limiting value
Bh	Operating hours
gBh	Limiting value exceeded

Switching delays

It is possible to delay switching on the automatic operation (**"Delay automatic start"**).

Command execution check

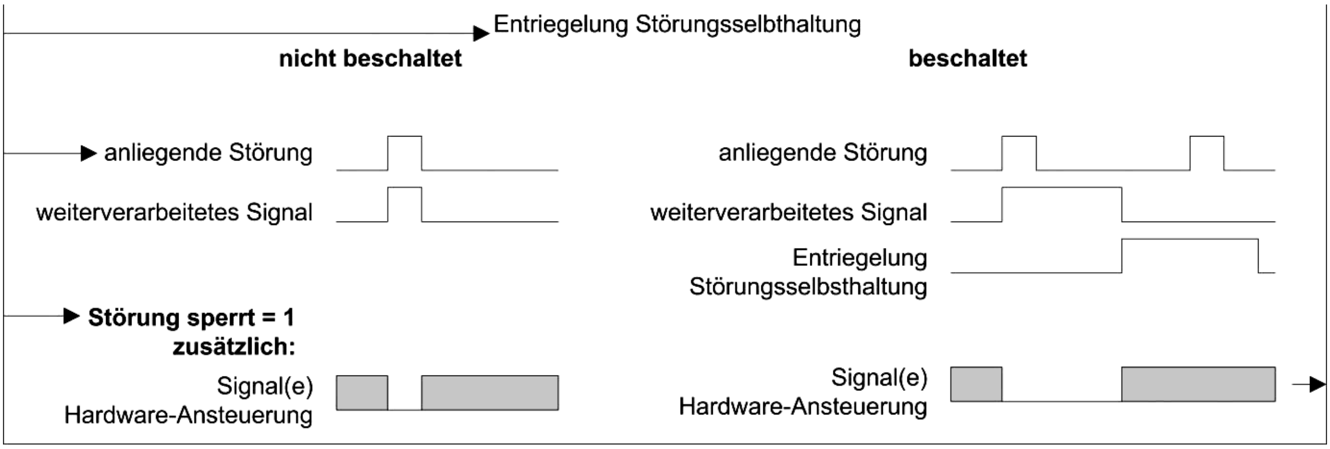
The function block contains a command execution check (refer to the command execution check for description and parameters) for the actual operating status: **"Operating message burner"**, Target operating status: **"Burner on"**, output: **"Status command execution check"**:
If the actual operating status is not switched no corresponding command execution check malfunction is signaled (**stCEC**).
"Release malfunction catch" resets the command execution check malfunction.
Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general CEC parameter
BrOn	Control signal from the object **Bsz**
BMBr	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Br1On and Br2On	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
A malfunction that occurs **SM** or **stCEC** may not influence the control of outputs.
a) not (**"malfunction blocked"** = 0)
b) switches the outputs **"request pump / cover"**, **"request control"** and **"Burner on"** off (**"malfunction blocked"** = 1)
If a malfunction sets the outputs to off, this can only be reset by activating the **"unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM **stCEC**	Malfunction(s) occurring
StLock	Malfunction blocked
AnfPK **reg** **BrOn**	Hardware control signal

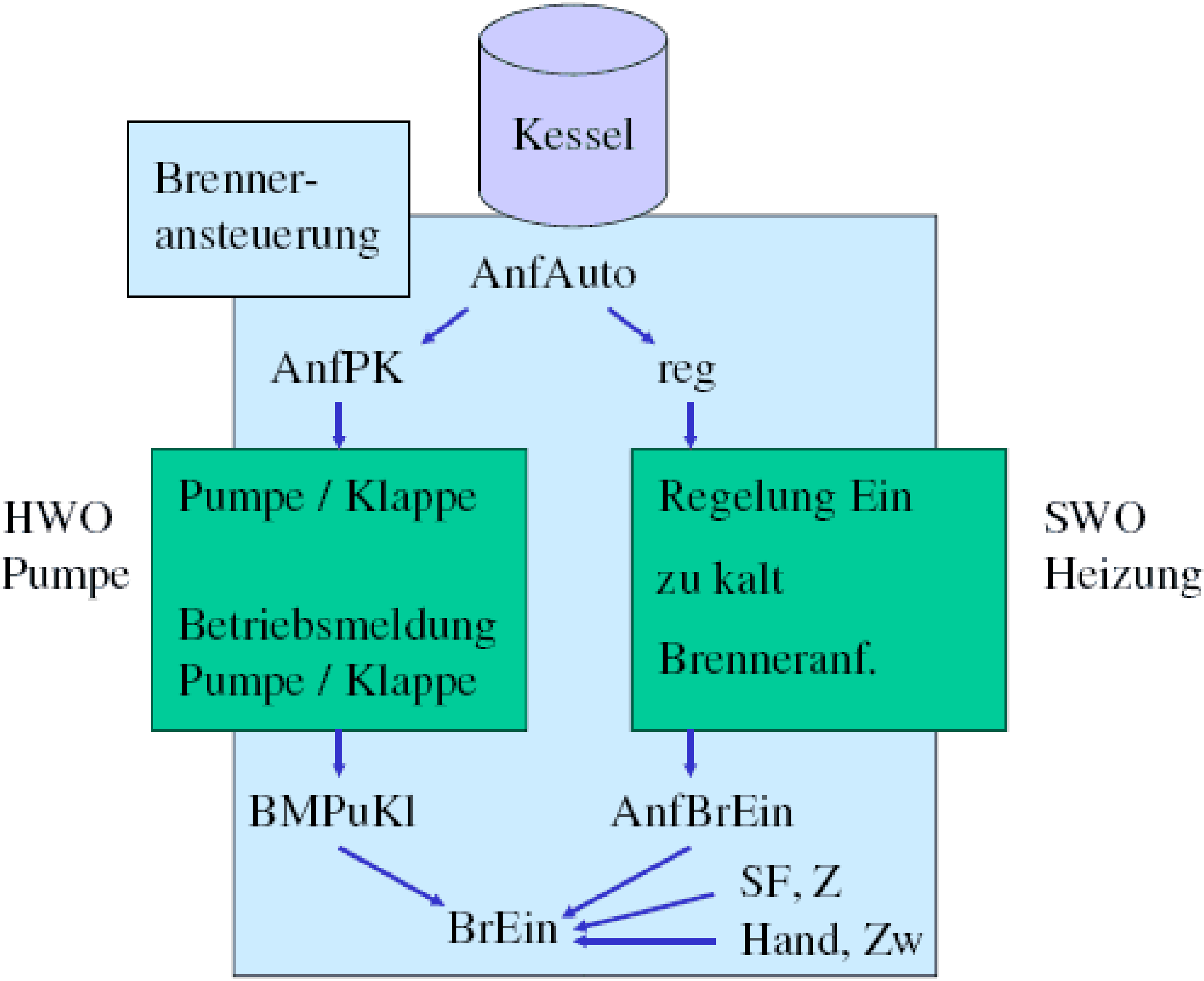
Status control/switch priorities

The following input parameters influence the control of the outputs:
AnfAuto, Ytarget, Z, DOL, Manual, Zw and SwZw, SM

Parameter / Value	Impact
Highest priority	
SM	Refer to "Trouble-shooting" section

Parameter / Value	Impact
Rep	**"Request pump / cover"** = 0 **"Request regulation"** = 0 **"Burner on"**= 0
Zw	**"Request pump / cover"** = 1 **"Request regulation"** = 1 if nec. **"Burner on"**== 1 **Y** = **SwZw**
Manual	**"Request pump / cover"** = 1 **"Request regulation"** = 1 if nec. **"Burner on"**== 1 **Y** = **Manual**
DOL	**"Request pump / cover"** = 0 **"Request regulation"** = 0 **"Burner on"**== 0
Z	**"Request pump / cover"** = 1 **"Request regulation"** = 1 If nec. **"Burner on"**== 1 **Y** = **Z**
Chimney sweep function	**"Request pump / cover"** = 1 **"Request regulation"** = 1 **"Burner on"**== 1 **Y** = 100%
Auto	Automatic operation, **"request pump / cover"** = **AnfAuto**
Lowest priority	

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.


Kessel
Brenner-
ansteuerung
AnfAuto
AnfPK
reg
HWO
Pumpe
Pumpe / Klappe
Betriebsmeldung
Pumpe / Klappe
Regelung Ein
zu kalt
Brenneranf.
SWO
Heizung
BMPuKl
AnfBrEin
SF, Z
BrEin
Hand, Zw

4.3.3.29. H704 Burner modulating

Function summary

The "burner modulating" function block controls a modulating burner and supports:

- pump and cover control during the warm-up phase / request for control
- Chimney sweep function
- Operating hours / limiting value
- Switching delays
- Command execution check
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Begin Automatic operation	actual value deletable boolean	--	--	deleted	--
2	**AnfBrEin** Begin Burner ON	actual value deletable boolean	--	--	deleted	--
3	**AnfPK** Begin Pump / Flap	actual value boolean	--	--	0	--
4	**AnlVerz** Startup delay of the automatic	set point integer	0	2147483647	0	s
5	**BMBr** Burner plant message	actual value deletable boolean	--	--	deleted	--
6	**BMPuKl** Plant message Pump/Flap	actual value deletable boolean	--	--	deleted	--
7	**Bh** Operating hours	set point integer	0	2147483647	0	h
8	**BhAktiv** Active opr. hours	set point boolean	--	--	0	--
9	**BhGw** Oper.hrs. limit value	set point integer	0	2147483647	2000	h
10	**BrEin** Burner ON	actual value boolean	--	--	0	--
11	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--
12	**Hand** Manual influence	set point deletable float	0	100	deleted	%

No.	name of parameter	parameter typ	min	max	init	unit
13	**Rep** Repare switch	actual value deletable boolean	--	--	deleted	--
14	**ResBh** Reset opr. hours	actual value deletable boolean	--	--	deleted	--
15	**ResSM** Unlock Malfunction catch	actual value deletable boolean	--	--	deleted	--
16	**SF** Chimneysweep function	set point deletable boolean	--	--	deleted	--
17	**SFZeit** Continuous chimneysweep function	set point integer	0	300	30	min
18	**SFaktiv** Cimneysweep function is active	actual value boolean	--	--	0	--
19	**SM** Burner malfunction	actual value deletable boolean	--	--	deleted	--
20	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
21	**VzBAK** stBAK delayed	set point integer	0	2147483647	0	s
22	**Y** Burner setp. setting	actual value float	0	100	0	%
23	**Yist** Position display	actual value float	0	100	0	%
24	**Yr** Burner setting feedback	set point deletable float	0	100	deleted	%
25	**Ysoll** Setp burner automatic	set point float	0	100	0	%
26	**Z** Z- influence	set point deletable float	0	100	deleted	%
27	**Zw** Forced control	set point deletable boolean	--	--	deleted	--
28	**ZwSw** Setp. valve forced control	set point deletable float	0	100	deleted	%
29	**gBh** Limit value error by opr.hrs.	actual value boolean	--	--	0	--
30	**reg** Begin Control ON	actual value boolean	--	--	0	--
31	**stBAK** Status BAK Burner	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
32	**tBAK** Time BAK	set point integer	0	2147483647	30	s
33	**SMout** SMout	actual value boolean	--	--	0	--

Function description

There is a **"position display"** output. This indicates this value if the **"position feedback signal burner"** input is occupied. If this acknowledgement is not occupied the value of the **"target position burner"** is used. This may come from **"Target burner position in automatic operation"**, **"Z influence"**, **"set point forced control"** or **"manual influence"**, i.e. from the input with the highest active priority.

Pump and cover control during the warm-up phase / request for control

If the burner is to be switched on the **"pump/cover request"** is first set to 1.
Then there is a pause for the **"operational message pump/cover"** = 1 if this input is wired.
At the same time as **"request pump/cover"** the **"request control"** is set to 1. This signals the subsequent control beyond the hardware object that the burner is standing by to produce heat. If then the signal **"request burner on"** is set to 1 by the control and **"operational message pump / cover"** =1, the burner is switched on (**"burner on"**=1).

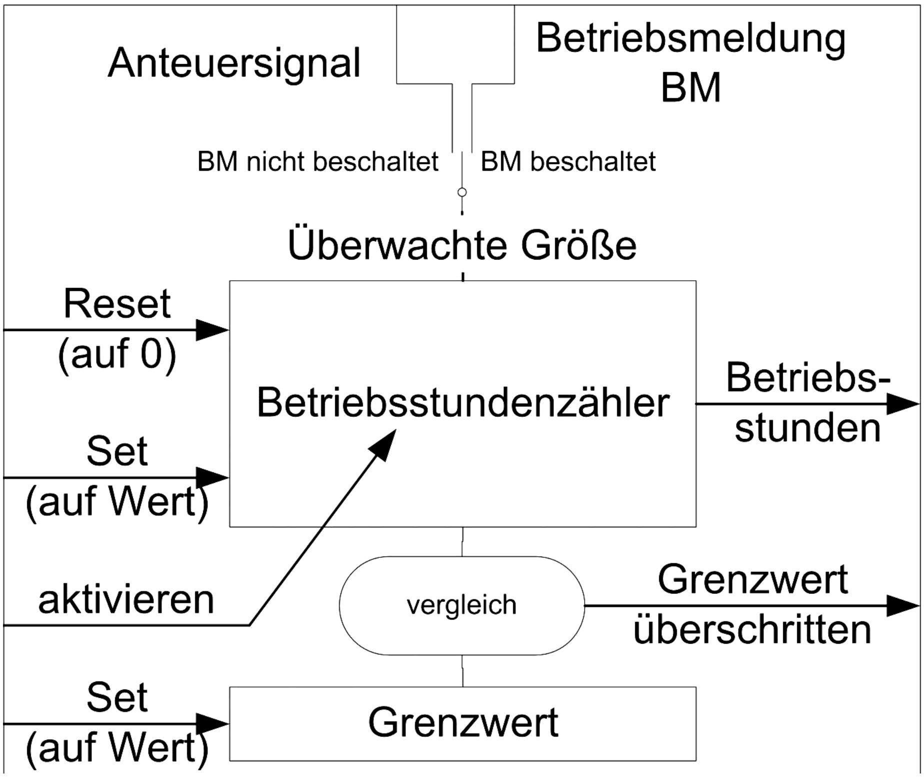
For **"operational message pump/cover"** this does not include a command execution check as **"request pump / cover"** should always be linked to a "pump" or "cover" hardware object that contains its own command execution check.

Chimney sweep function

The chimney sweep function switches the burner on for the**"chimney sweep function time span"** if the burner is in automatic mode and is not already switched on.
If the burner is in automatic mode and already switched on the plant ensures that the burner stays on for the **"chimney sweep function time span"**, even if the **"request automatic operation"** is set to 0 in this time. Here the Y signal goes to 100%.
When the chimney sweep function is activated the **"chimney sweep function active"** parameter is set to 1.

Operating hours / limiting value

The operating hours of the burner can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded a message is produced. If the input for the burner operating message is not switched the control output "**burner on"** is used for counting.



HWO parameter	corresponding general operating hour parameter
BrOn	Control signal
BMBr	Operating message
ResBh	Reset operating hours
Bh	Set operating hours
BhActive	activate
BhGw	Set limiting value
Bh	Operating hours
gBh	Limiting value exceeded

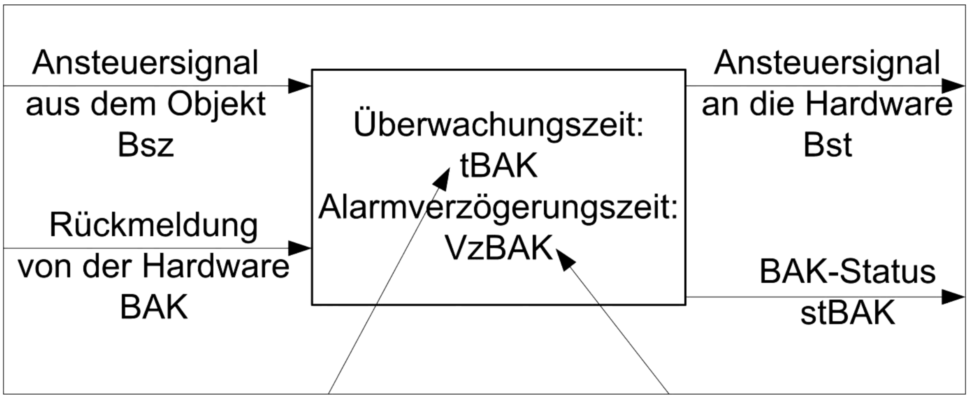
Switching delays

It is possible to delay switching on the automatic operation (**"Delay automatic start"**).

Command execution check

The function block contains a command execution check (refer to the command execution check for description and parameters) for the actual operating status: **"Operating message burner"**, Target operating status: **"Burner on"**, output: **"Status command execution check"**:
If the actual operating status is not switched no corresponding command execution check malfunction is signaled (**stCEC**).

"Release malfunction catch" resets the command execution check malfunction.
Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



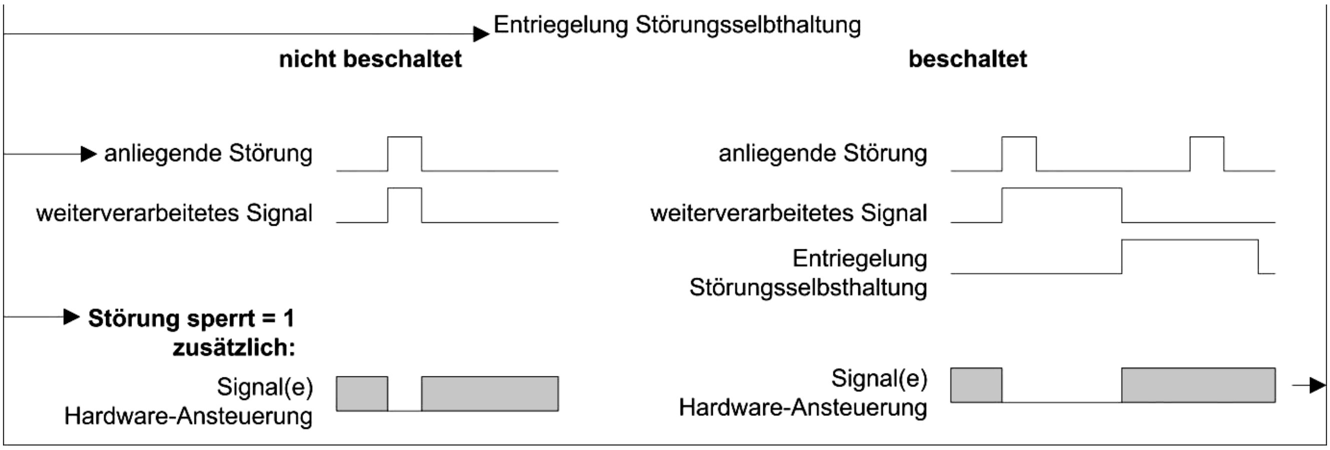
HWO parameter	corresponding general CEC parameter
BrOn	Control signal from the object **Bsz**
BMBr	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Br1On and Br2On	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
A malfunction that occurs **SM** or **stCEC** may not influence the control of outputs.

a) not (**"malfunction blocked"** = 0)
b) switches the outputs **"request pump / cover"**, **"request control"** and **"Burner on"** off (**"malfunction blocked"** = 1)

If a malfunction sets the outputs to off, this can only be reset by activating the **"unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM **stCEC**	Malfunction(s) occurring
StLock	Malfunction blocked
AnfPK **reg** **BrOn**	Hardware control signal

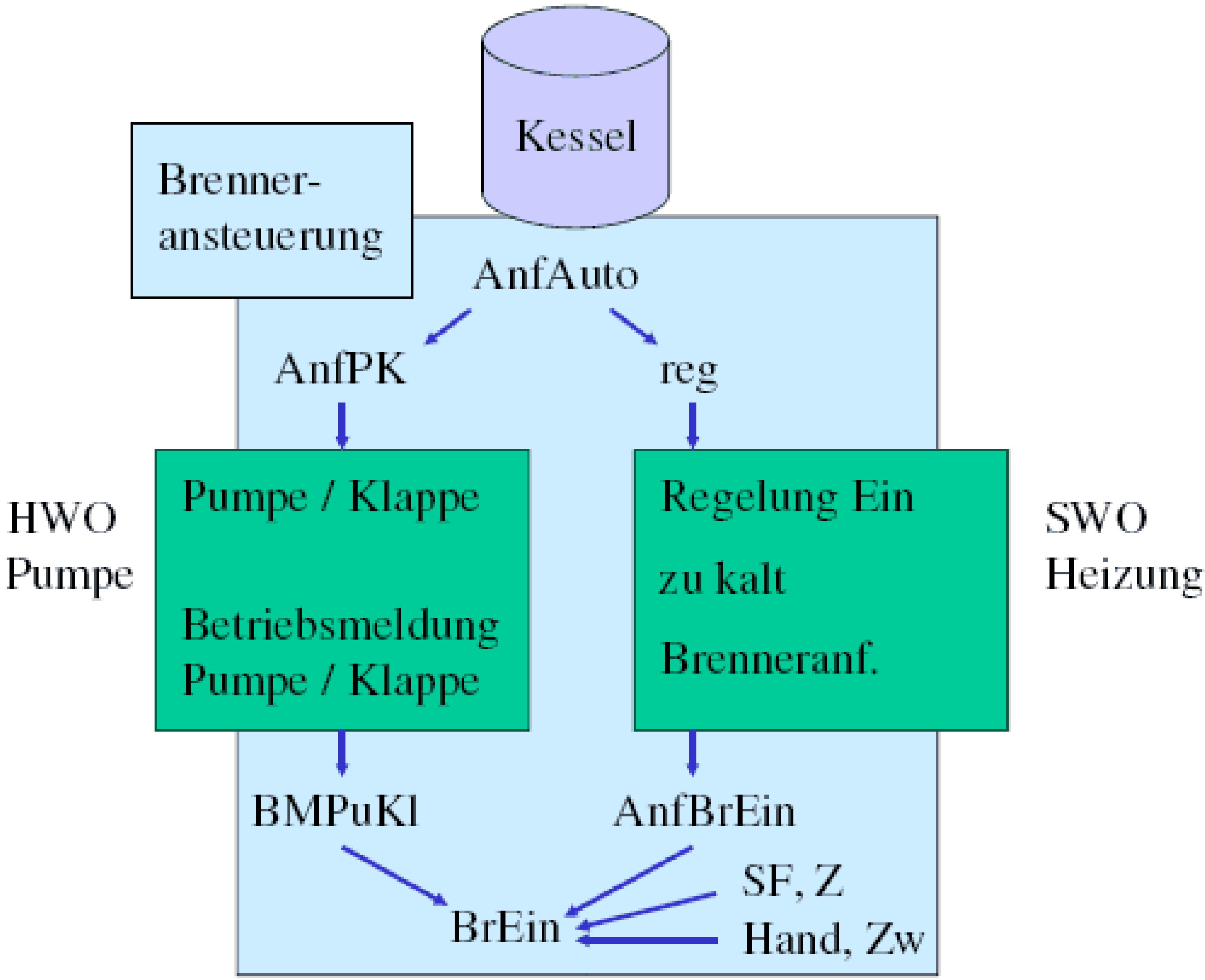
Status control/switch priorities

The following input parameters influence the control of the outputs:
AnfAuto, Ytarget, Z, DOL, Manual, Zw and SwZw, SM

Parameter / Value	Impact
Highest priority	
SM	Refer to "Trouble-shooting" section
Rep	**"Request pump / cover"** = 0 **"Request regulation"** = 0 **"Burner on"**= 0
Zw	**"Request pump / cover"** = 1 **"Request regulation"** = 1 if nec. **"Burner on"**== 1 **Y** = **SwZw**
Manual	**"Request pump / cover"** = 1 **"Request regulation"** = 1 if nec. **"Burner on"**== 1 **Y** = **Manual**

Parameter / Value	Impact
DOL	**"Request pump / cover"** = 0 **"Request regulation"** = 0 **"Burner on"**== 0
Z	**"Request pump / cover"** = 1 **"Request regulation"** = 1 If nec. **"Burner on"**== 1 **Y** = **Z**
Chimney sweep function	**"Request pump / cover"** = 1 **"Request regulation"** = 1 **"Burner on"**== 1 **Y** = 100%
Auto	Automatic operation, **"request pump / cover"** = **AnfAuto**
Lowest priority	

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.


Kessel
Brenner-
ansteuerung
AnfAuto
AnfPK
reg
HWO
Pumpe
Pumpe / Klappe
Betriebsmeldung
Pumpe / Klappe
Regelung Ein
zu kalt
Brenneranf.
SWO
Heizung
BMPuKl
AnfBrEin
SF, Z
BrEin
Hand, Zw

4.3.3.30. H801 Volume flow regulator constant

Function summary

The "constant volume flow controller" function block controls a cover that can be opened or closed and considers a cover run time.

The function block supports:

- Final position replication
- Command execution check
- Trouble-shooting
- Status control unit using Z influence, DOL, manual influence, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Auf** End pos. OPEN	actual value deletable boolean	--	--	deleted	--
2	**Zu** End pos. SHUT	actual value deletable boolean	--	--	deleted	--
3	**AnfAuto** Begin Automatic	actual value deletable boolean	--	--	deleted	--
4	**Yr** Servo back fan	actual value deletable integer	0	100	deleted	%
6	**Y** Actuation of fan	actual value boolean	--	--	0	--
9	**DBE** DBE Status	actual value deletable boolean	--	--	deleted	--
10	**Hand** Manual influence	set point multistate	--	3	0	value,text 9,Manual Auto 1,Manual OPEN 0,Manual SHUT
14	**ResSM** Enter malf. msg	actual value deletable boolean	--	--	deleted	--
16	**StSperr** StLock	set point boolean	--	--	0	--
17	**VzBAK** StBAK delayed	set point integer	0	2147483647	0	s
18	**Z** Z- influence	set point multistate	--	3	0	value,text 9,Z-Auto 1,Z OPEN 0,Z SHUT

No.	name of parameter	parameter typ	min	max	init	unit
19	**Zw** Forced control	set point multistate	--	3	0	value,text 9,Forced Auto 1,Forced OPEN 0,Forced SHUT
21	**reg** Release.Reg. VVS	actual value boolean	--	--	0	--
25	**stBAK** Status BAK	actual value boolean	--	--	0	--
26	**tBAK** TimeBAK	set point integer	0	2147483647	30	s
27	**tMot** Motor runtime	set point integer	0	600	120	s
30	**Stell** Setting	actual value multistate	--	3	1	value,text 1,OPEN 0,SHUT 24,Running

Function description

A new output **reg** that visualizes the request for the volume flow regulator (**AnfAuto**) was added.

Final position replication

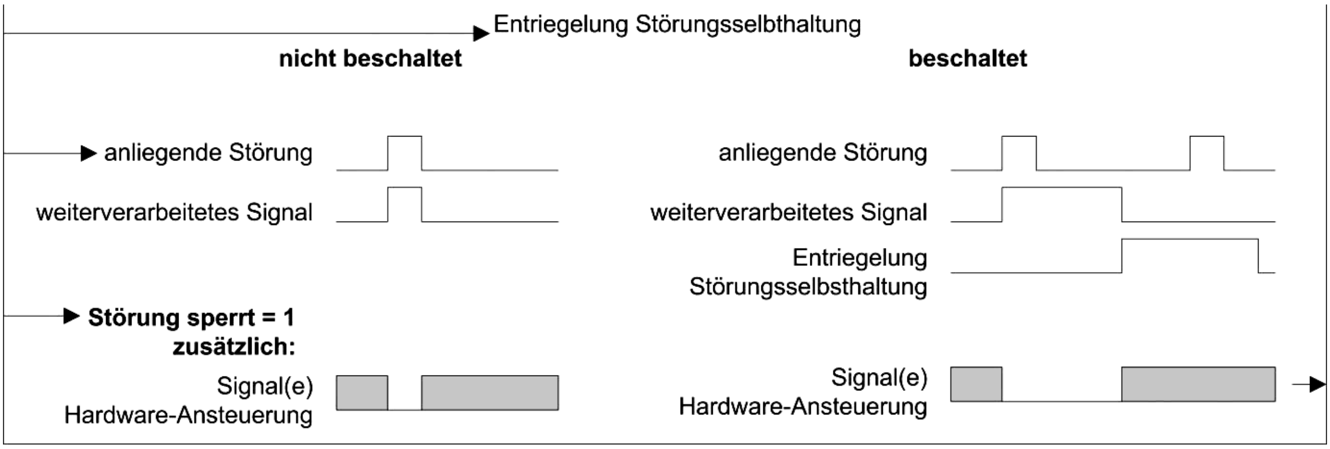
The **"final position open"**, **"final position closed"** and **"position feedback signal valve"** inputs can be wired if required.
If the **"position feedback signal valve"** is wired, but not the**"final position open"** and **"final position closed"**, both final position are determined via the **"position feedback signal valve"**. If **"position feedback signal valve"** < 3% a "closed" final position is assumed, if **"position feedback signal valve"** > 97% an "open" final position is assumed, otherwise "running".
If the plant in addition to **"position feedback signal valve"**is also wired for **"final position open"** or **"final position open"** these inputs have higher priority.
If only one of the **"final position open"** or **"final position closed"** is switched but not **"position feedback signal valve"**, the final position that is not switched is determined via the **"motor operating time"**.
If e.g. only **"final position closed"** is switched after an "open" control the **"Setting"** output is first set to "running" and after the end of the **"Motor operating time"** set to "open".
If both **"final position open"** and **"final position closed"** are not switched the final position-replication occurs in the same way for both final positions but a command execution check is not however effective.

Malfunction catch / malfunction handling

If "unlock malfunction catch" is wired malfunctions that occur are saved and can be reset by activating the "unlock malfunction catch".

No input "Valve malfunction" (SM).

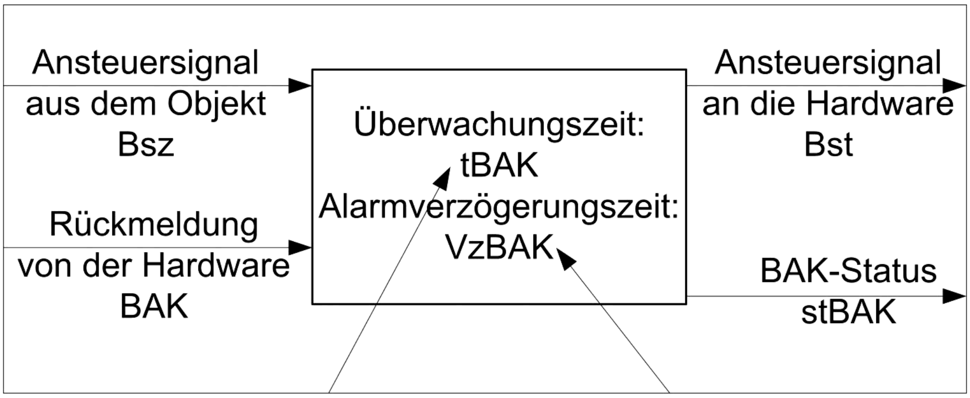
An adjoining command execution check may optionally influence the control of the "control valve" output
a) not ("malfunction blocked" = 0)
b) the output "Control valve" switches to "closed" ("malfunction blocked" = 1)
If a malfunction sets the output "control valve" to "closed" this can only be reset by activating the "unlock malfunction catch".
If "unlock malfunction catch" is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
stCEC	Malfunction(s) occurring
StLock	Malfunction blocked
Y	Hardware control signal

Command execution check

The function block contains a command execution check (refer to the command execution check section for description and parameters) for the actual operating status **"Setting"** that is formed as described above.
The target operating status is **"control valve"**; the output is **"Status command execution check"**.
"Release malfunction catch" resets the command execution check malfunction.



HWO parameter	corresponding general CEC parameter
Y	Control signal from the object **Bsz**
Yr	Acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Y	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

Switching priorities

The function block supplies an output signal "Control valve". The following input parameters influence the control of this output:
AnfAuto(open/closed), Z(open/closed), DOL, Manual(open/closed), Zw(open/closed), stCEC

The statuses Z, manual, forced and that of the DOL are considered.
(Z-closed, Manual-closed, Zw-closed or DOL => **reg** = 0)

Priority	Parameter / Value	Action
Highest	**stCEC**	Refer to "Trouble-shooting" section
	Manual/Closed, Zw/Closed	Control valve: "closed"
	Manual/open, Zw/open	Control valve: "open"
	Z/closed, DOL	Control valve: "closed"
	Z/open	Control valve: "open"
lowest	**Auto**	Automatic operation

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.3.31. H802 Volume flow regulator constant

Function summary

The "volume flow regulator constant" function block controls a constant cover with target setting of 0...100%.

The function block supports:

- Trouble-shooting/malfunction catch
- Status control unit using Z influence, DOL, manual influence, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Auf** End pos. OPEN	actual value deletable boolean	--	--	deleted	--
2	**Zu** End pos. SHUT	actual value deletable boolean	--	--	deleted	--
3	**Ysoll** Yset	set point float	0	100	0	%
4	**Yr** Servo back fan	actual value deletable float	0	100	deleted	%
5	**Yist** Setting no.	actual value float	0	100	0	%
6	**Y** Setp. valve	actual value deletable float	0	100	deleted	%
7	**AnfAuto** Begin Automatic	actual value deletable boolean	--	--	deleted	--
9	**DBE** DBE Status	actual value deletable boolean	--	--	deleted	--
10	**Hand** Manual influence	set point deletable float	0	100	deleted	%
14	**ResSM** Enter malf. msg	actual value deletable boolean	--	--	deleted	--
15	**SM** Valve malf.	actual value deletable boolean	--	--	deleted	--
16	**StSperr** StLock	set point boolean	--	--	0	--
18	**Z** Z- influence	set point deletable integer	0	100	deleted	%

No.	name of parameter	parameter typ	min	max	init	unit
19	**Zw** Forced control	actual value deletable boolean	--	--	deleted	--
20	**SwZw** Setpoint forced control	set point integer	0	100	100	%
21	**reg** Release.Reg. VVS	actual value boolean	--	--	0	--
22	**SMout** SMout	actual value boolean	--	--	0	--

Function description

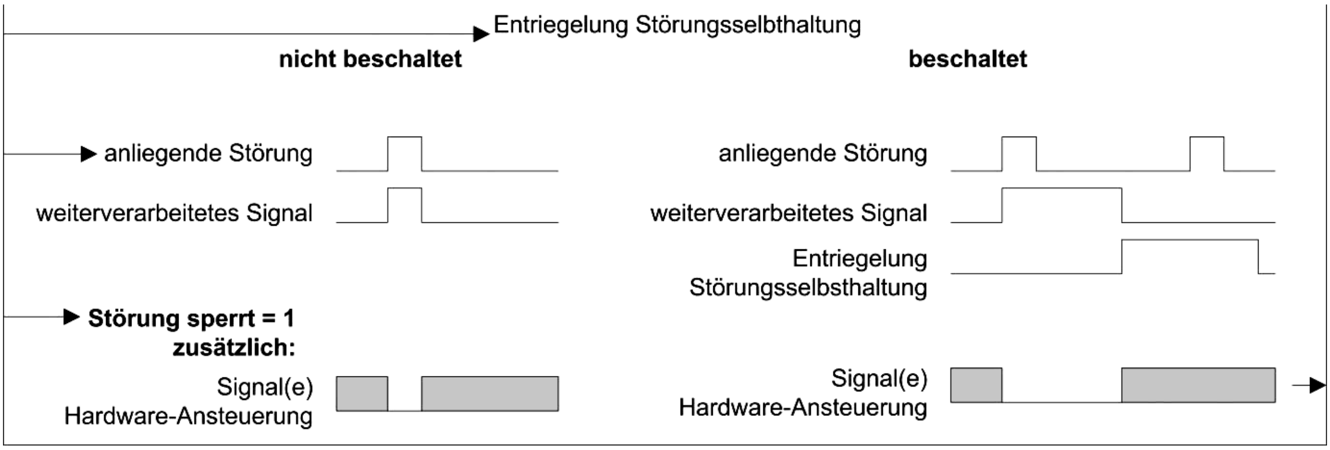
Parameter "**AnfAuto**" was added in which for example the "release control" for a PID control can be set. The corresponding output **regVVS** therefore produces a release for the VVS control. If a malfunction occurs this release is set to zero.

Position display

There is a **"position display"** output. This indicates this value if the **"position feedback signal valve"** input is occupied. If this acknowledgement is not occupied the value of the **"target position valve"** is used. This may come from **"Target valve position in automatic operation"**, **"Z influence"**, **"set point forced control"** or **"manual influence"**, i.e. from the input with the highest active priority.

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
A malfunction that occurs **SM** may not influence the control of output**Y**
a) not (**"malfunction blocked"** = 0)
b) sets the output **Y** to 0% (**"malfunction blocked"** = 1)
If a malfunction sets the output **Y** to 0% this can only be reset by activating the **"Unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM	Malfunction(s) occurring
StLock	Malfunction blocked
Y	Hardware control signal

Switching priorities

The function block supplies an output signal **"Target setting valve"**. The following input parameters influence the control of this output:
Ytarget, Z, DOL, Manual, Zw and ZwSw, SM

Priority	Parameter / Value	Action
Highest	**SM**	See "effects of malfunctions on operating behavior" section.
	Zw	**Y = ZwSw**
	Manual	**Y = Manual**
	DOL	**Y** = 0%
	Z	**Y = Z**
lowest	**Auto**	**Y = Ytarget**

4.3.3.32. H901 Pump single stage

Function summary

The "pump single stage" function block controls a single-stage pump and supports:

- Switching delays
- Pump blocking protection
- Operating hours / limiting value
- Command execution check
- Malfunction catch / malfunction handling
- Status control unit using Z influence, direct operating level(DOL), manual influence, repair switch, forced control

Attention! "malfunction blocked"

An important note:
How does "malfunction blocked" work?

The "malfunction blocked" parameter can be set to yes or no. If a malfunction occurs either the output is switched off or the malfunction does not affect the outputs.

The **malfunction catch** is activated by linking a source on ResSM (Reset malfunction message). Only in this case is it possible to reset a malfunction message. Here a link creates a function.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Begin Automatic	actual value deletable boolean	--	--	deleted	--
2	**BM** Re: msg. Pu	actual value deletable boolean	--	--	deleted	--
3	**pbs** Status blocking prot.	actual value boolean	--	--	0	--
5	**Hand** Manual	set point multistate	--	3	0	value,text 9,Auto 0,OFF 1,ON
7	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
8	**ResSM** Unlock Fault	actual value deletable boolean	--	--	deleted	--
9	**reg** Begin Control	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
10	**Rep** Rep.switch	actual value deletable boolean	--	--	deleted	--
11	**SM** Pump malfunction	actual value deletable boolean	--	--	deleted	--
12	**PuNach** Pump coasting	set point integer	0	120	0	min
13	**Z** Z- influence	set point multistate	--	3	0	value,text 9,Auto 0,OFF 1,ON
14	**Zw** Forced control	set point multistate	--	3	0	value,text 9,Auto 0,OFF 1,ON
15	**DBE** Dir. oper. level	set point deletable boolean	--	--	deleted	--
16	**BhGw** Total opr.hours	set point integer	0	2147483647	0	h
17	**BhAktiv** BHActive Y/N	set point boolean	--	--	0	--
18	**ResBh** Reset Operating	actual value deletable boolean	--	--	deleted	--
19	**Pu** Pump ON	actual value boolean	--	--	0	--
20	**gBh** Limit value viol.	actual value boolean	--	--	0	--
21	**AnlVerz** Start delay Aut	set point integer	0	2147483647	0	s
22	**tBAK** Time BAK	set point integer	0	2147483647	30	s
23	**VzBAK** stBAK delayed	set point integer	0	2147483647	0	s
24	**StzPBS** Block start time	set point integer	0	2147483647	720	min
25	**LzPBS** Block run time	set point integer	0	2147483647	0	min
26	**stBAK** Command Status	actual value boolean	--	--	0	--

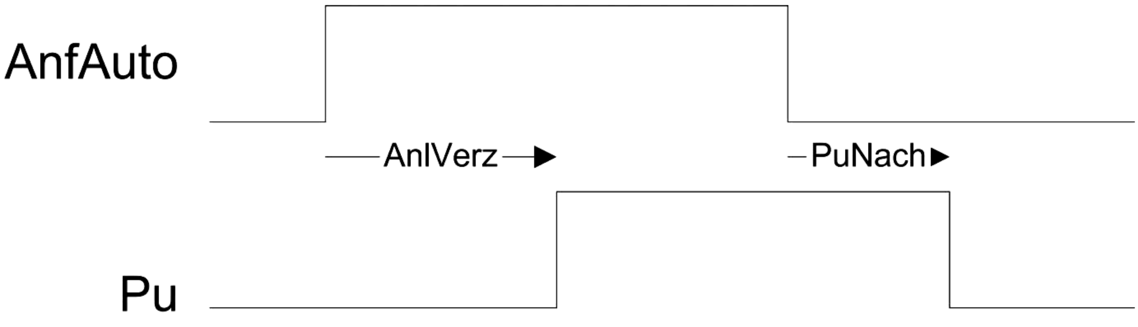
No.	name of parameter	parameter typ	min	max	init	unit
27	**Bh** Oper.hrs.	set point integer	0	2147483647	0	h
28	**SMout** SMout	actual value boolean	--	--	0	--

Function description

Switching delays

It is possible to delay switching the pump on in automatic operation (**"Delay automatic start"**). This can be used for example to avoid peak loads.

It is possible to delay switching the pump off in automatic operation (**"Pump hunting"**).

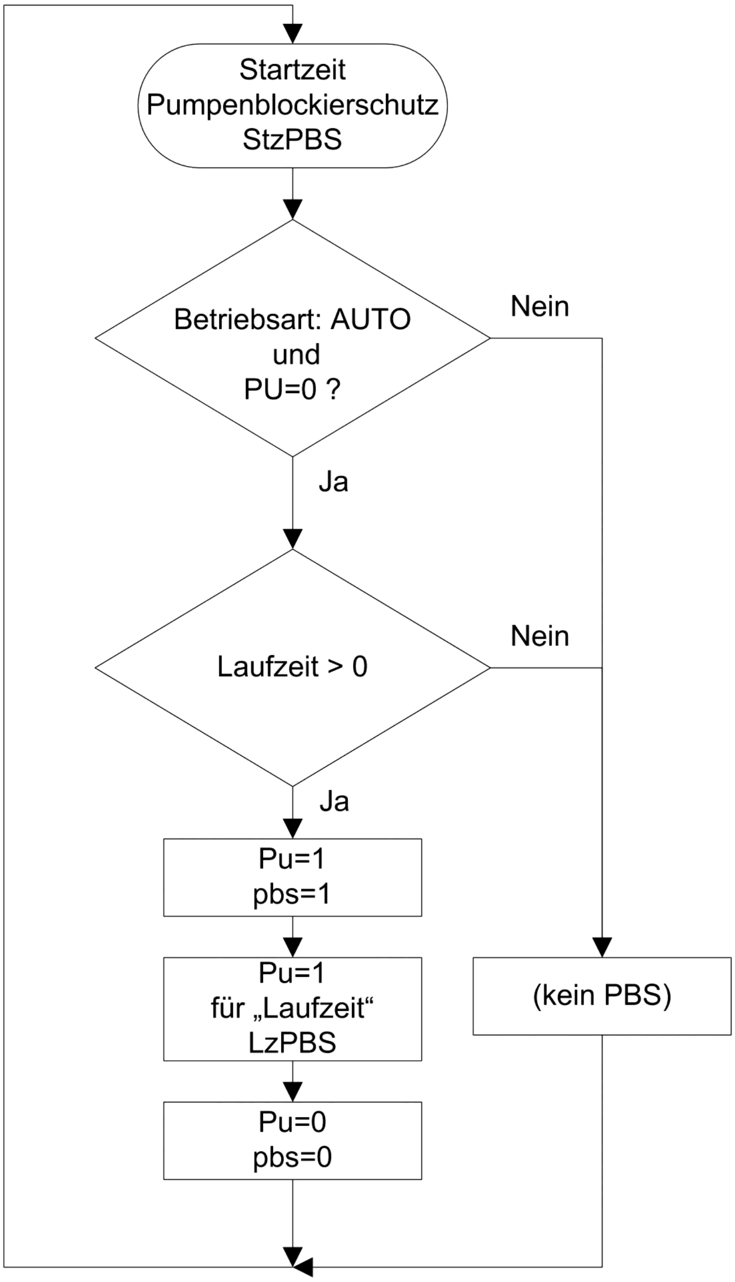


Pump blocking protection

In order to avoid blocking the pump if it is inactive for longer periods of time this function can be used to run the pump once a day even if it is otherwise not required. **"Start time block"** corresponds to the minutes of the day calculated from midnight. "**Run time block"** is also stated in minutes.

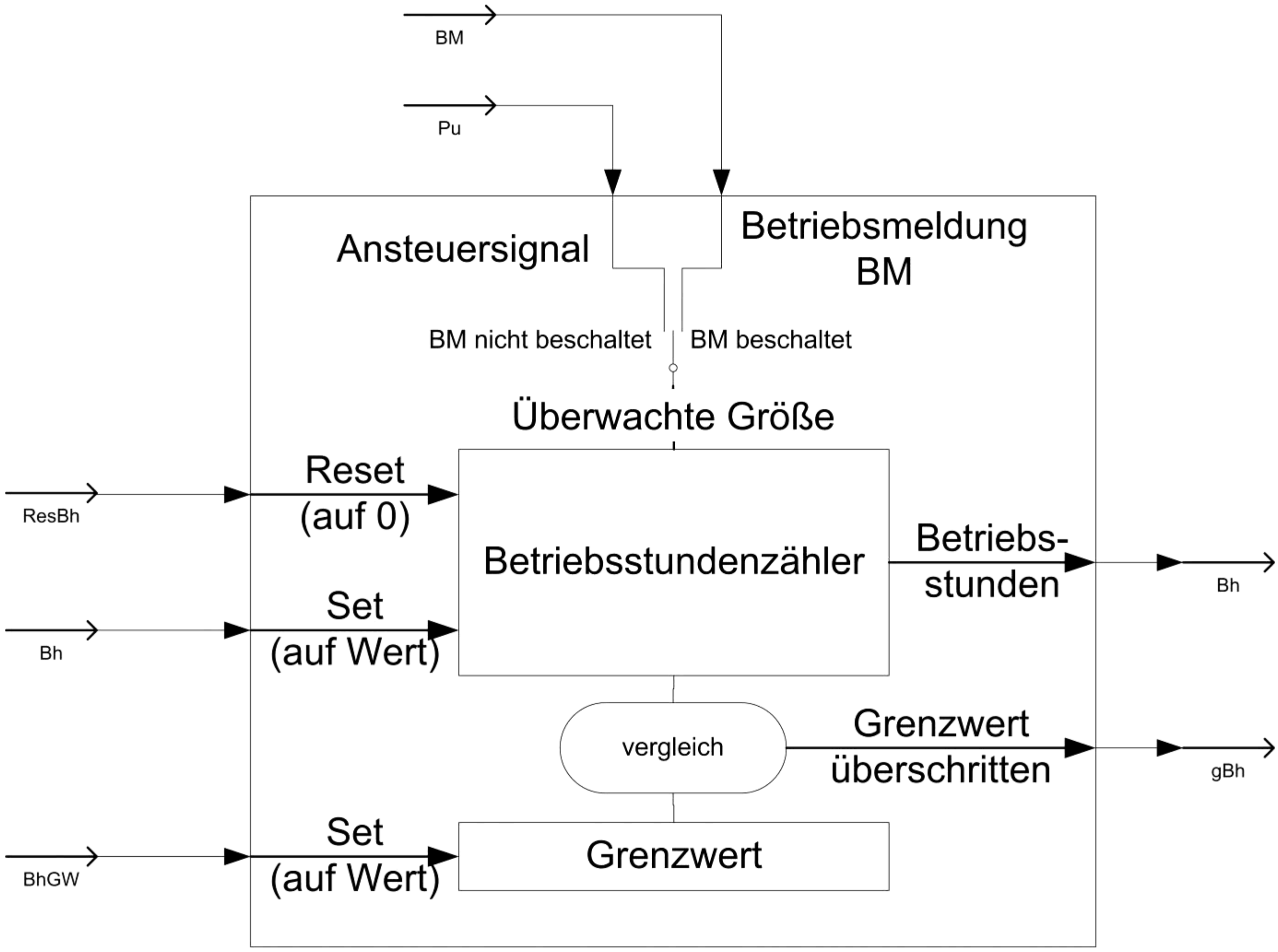
If the value 0 is entered for the **LzPBS** operating time this function does not work.

The pump blocking protection switches the pump on if this is not running at the switch on time **"Start time block"** and automatic operation is activated, **"Status blocking protection"** is set to 1 in this time.



Operating hours / limiting value

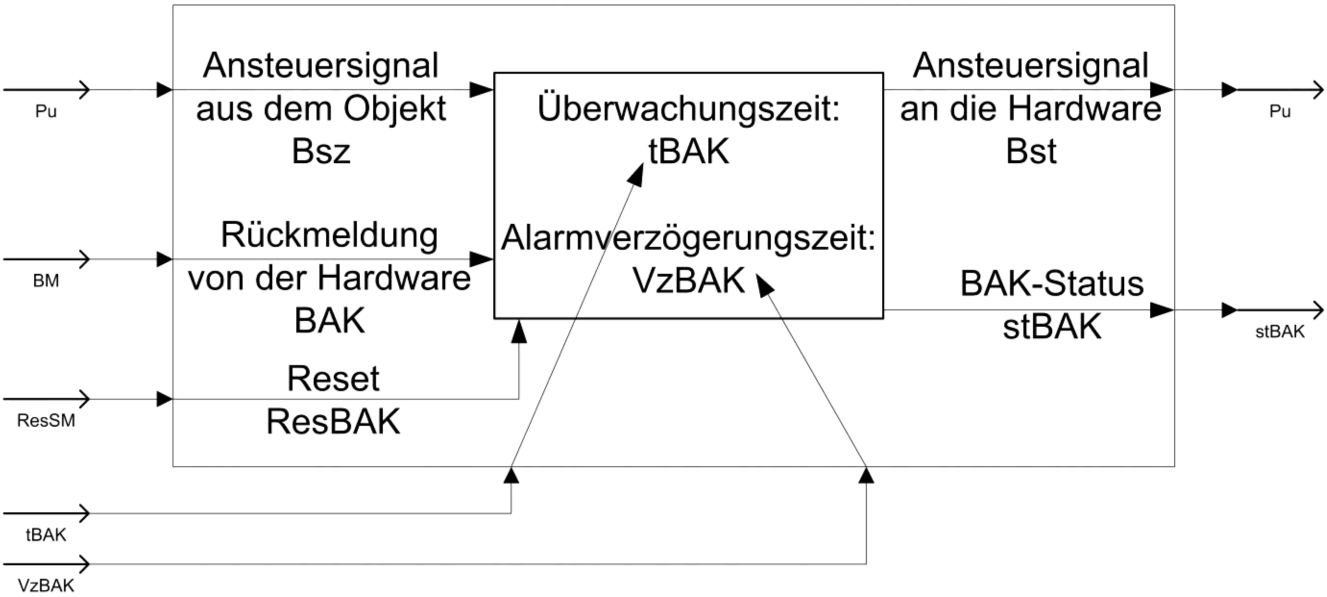
The operating hours of the pump can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded the parameter **"limiting value infringement"** is set. If the input for the pump operating message is not switched the pump output is used for counting. When setting the **"Reset operating hours"** parameter the operating hour value is set to 0.



Command execution check

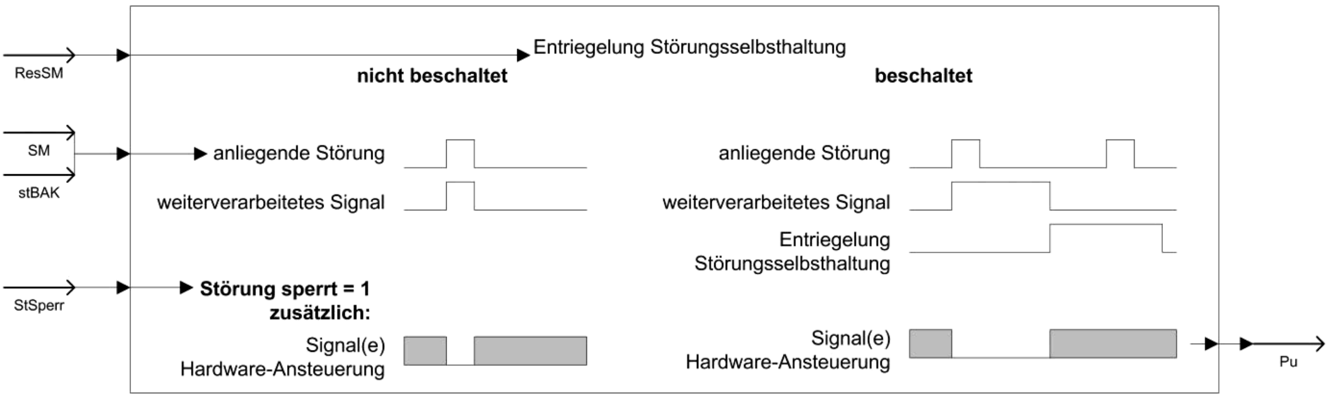
If a **"Pump operating message"** is switched up the operating message status is checked for a switching command after the time tCEC. In cases of malfunction the **"Status command execution check"** parameter is set. The malfunction is caught by itself. **"Release malfunction catch"** resets the **"command execution check malfunction"**.

- Target operational status: **"Pump operating message"**
- Target operational status: **"Pump ON"**
- Output: **"Status command execution check"**:



Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
An adjoining malfunction**SM** or **stCEC** may influence the control of the **"Pump ON"** output.
a) not (**"malfunction blocked"** = 0)
b) the output **"Pump ON"** switches to "closed" (**"malfunction blocked"** = 1)
If a malfunction sets the output **"Pump ON"** to off, this can only be reset by activating the **"unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



Status control/switch priorities

The following input parameters influence the control of the outputs:
AnfAuto, Z(on/off), DOL, manual(on/off), Zw(on/off), Rep, SM

Priority	Parameter / Value	Impact
Highest	**SM**	Refer to "Trouble-shooting" section

Priority	Parameter / Value	Impact
	Manual/open, Zw/open, Rep	**Pu = 0**
	Manual/open, Zw/open	**Pu** = 1
	Z/closed, DOL	**Pu** = 0
	Z/On	**Pu** = 1
lowest	**AnfAuto**	if **AnfAuto** = 1, then automatic operation

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

Request regulation

If the pump (not as a result of the pump blocking protection **pbs**) is switched on (**PU**=1) and the operating message whose proper function is shown, the signal **reg** (request regulation) is set to 1.

4.3.3.33. H903 Pump variable transformer

Function summary

The function block ("pump variable transformer" (also called "pump frequency converter" or "pump FC") controls a rev-controlled pump with optional bypass switch as per a set point **Ptarget**. The function block supports:

- Operating hours / limiting value
- Switching delays
- Command execution check
- Pump blocking protection
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Begin Automatic operation	actual value deletable boolean	--	--	deleted	--
2	**Psoll** Pump setpoint	set point integer	0	100	0	%
3	**PuFu** Pump FU ON	actual value boolean	--	--	0	--
4	**PuBy** Pump Bypass ON	actual value boolean	--	--	0	--
5	**reg** Begin Control	actual value boolean	--	--	0	--
6	**Y** Setp. setting of FU	actual value integer	0	100	0	%
7	**BM** Pump operation	actual value deletable boolean	--	--	deleted	--
8	**SM** Pump fault	actual value deletable boolean	--	--	deleted	--
9	**Rep** Repare switch	actual value deletable boolean	--	--	deleted	--
10	**AnlVerz** Start delay Automatic	set point integer	0	2147483647	0	s

No.	name of parameter	parameter typ	min	max	init	unit
11	**BMFu** FU operation	actual value deletable boolean	--	--	deleted	--
12	**Bh** Oper.hrs. presetting	set point integer	0	2147483647	0	h
13	**BhAktiv** Oper.hrs.cnt. activation	set point boolean	--	--	0	--
14	**BhGw** Oper.hrs. limit value	set point integer	0	2147483647	0	h
15	**ByAktiv** Bypass activation	actual value boolean	--	--	0	--
16	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--
17	**Hand** Manual switch (Autom./OFF/FU ON/Bpass ON)	set point multistate	--	4	0	value,text 9,Auto 0,OFF 21,FU_ON 31,BY_ON
18	**LzPBS** Run time blocking prot.	set point integer	0	2147483647	0	min
19	**PuNach** Pump coasting	set point integer	0	120	0	min
20	**RMAna** Servo feedback from the FU	actual value deletable integer	0	100	deleted	%
21	**ResBh** Reset oper. hours	actual value deletable boolean	--	--	deleted	--
22	**ResSM** Unlock malfunction catch	actual value deletable boolean	--	--	deleted	--
23	**RzByFu** Switch-back time bypass FU	actual value integer	0	120	30	s
24	**SMFu** Malfunction FU	actual value deletable boolean	--	--	deleted	--
25	**StFuBy** Malf. FU requires bypass	set point boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
26	**StFuSper** Malf. FU blocked	set point boolean	--	--	0	--
27	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
28	**StzPBS** Start time blocking prot.	set point integer	0	2147483647	720	min
29	**VzBAK** stBAK delayed	actual value integer	0	2147483647	0	s
30	**VzBAKFu** stBAKFu delayed	set point integer	0	2147483647	0	s
31	**Z** Z- influence	set point multistate	--	4	0	value,text 9,Auto 0,OFF 21,FU_ON 31,BY_ON
32	**ZW** Forced control	set point multistate	--	3	0	value,text 9,Auto 0,OFF 1,ON
33	**Zs** Pump Z-influence setpoint	set point integer	0	100	0	%
34	**ZwSw** Setpoint forced control	set point integer	0	100	0	%
35	**gBh** Limit value error by opr.hrs.	actual value boolean	--	--	0	--
36	**pbs** Blocking prot. active	actual value boolean	--	--	0	--
37	**stBAK** Status pump command exe control	actual value boolean	--	--	0	--
38	**stBAKFu** Status FU command exe control	actual value boolean	--	--	0	--
39	**tBAK** Time BAK	set point integer	0	2147483647	30	s
40	**tBAKFu** Time BAKFu	set point integer	0	2147483647	30	s
41	**SMout** SMout	actual value boolean	--	--	0	--

Function description

Bypass

The optional bypass branch secures pump operation; if a frequency converter malfunction occurs the pump runs without control in this case. The outputs **"Pump FC ON"** and **"Pump Bypass ON"** are never active at the same time. The bypass function is switched on or off using the **ByAktiv** parameter.

Switching delays

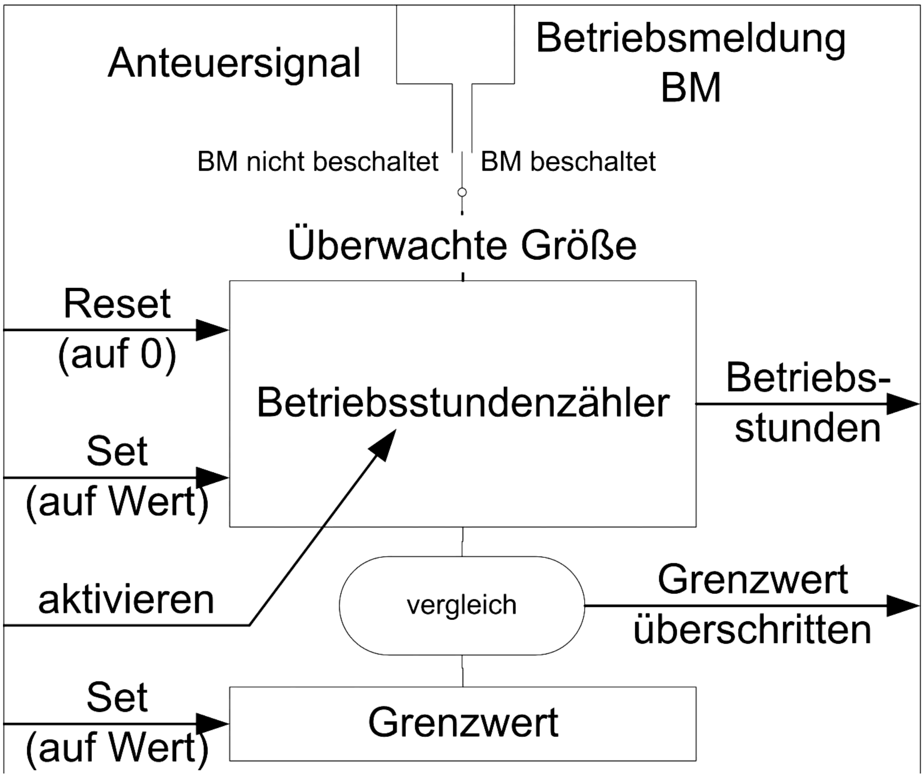
It is possible to delay switching the pump on in automatic operation (**"Delay automatic start"**).
It is possible to delay switching the pump off in automatic operation (**"Pump hunting"**).
The transfer from bypass to FC operation can be equipped with a delay: **RzByFu**, this delay only works in automatic operation.

Pump blocking protection

The function block includes the "pump block protection" function. If the value 0 is entered for the **LzPBS** operating time this function does not work. The pump blocking protection switches the FC mode **Y** on with a fixed set point of 10%. The pump blocking protection only switches the pump on if this is not running at the switch on time and automatic operation is activated, **"Blocking protection active"** is set to 1 in this time.
The function block delivers an output signal **"request control"** that switches when the pump output and not the**"Blocking protection active"** is due.

Operating hours / limiting value

The operating hours of the pump can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded a message is produced. If the input for the pump operating message is not switched the pump output is used for counting. Operating hours are counted in bypass and FC operation.



HWO parameter	corresponding general operating hour parameter
PuFu or PuBy	Control signal
BM	Operating message
ResBh	Reset operating hours
Bh	Set operating hours
BhActive	activate
BhGw	Set limiting value
Bh	Operating hours
gBh	Limiting value exceeded

Command execution check

Command execution checks (refer to command execution check section for description and parameters) exist for

Target operational status: **"Operating message pump"**, Target operating status: **("Pump FC ON"** || **"Pump Bypass ON"**), output: **"Status pump command execution check"**

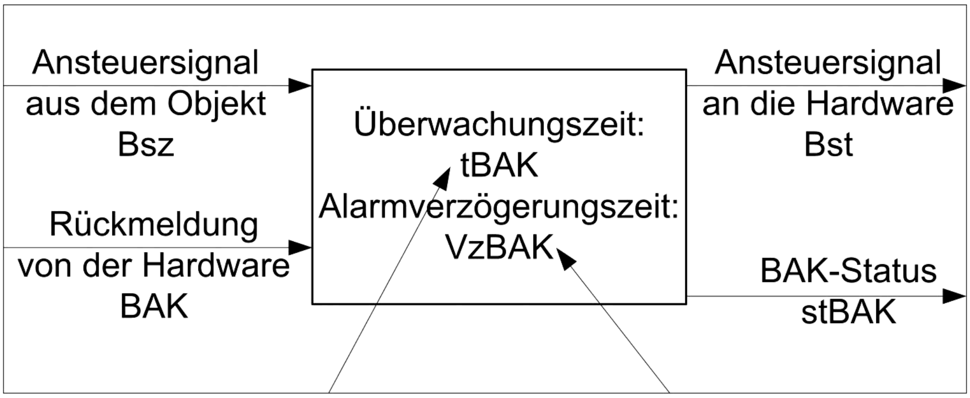
Target operational status: **"Operating message FC"**, Target operating status: **"Request FC control"**, output: **"Status FC command execution check"**

If the actual operating statuses are not switched, no corresponding command execution check

malfunction is signaled (**stCEC**or**stCECFu**).

"Release malfunction catch" resets the command execution check malfunction.

Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general CEC parameter
PuFu or PuBy	Control signal from the object **Bsz**
BM	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Y	Control signal to the hardware **Bst**
stCEC	CEC status **stCEC**

HWO parameter	corresponding general CEC parameter
reg	Control signal from the object **Bsz**
BMFu	acknowledgement from hardware **CEC**
tCECFu	Monitoring time **tCEC**
VzCECFu	Alarm delay time **VzCEC**
PuFu	Control signal to the hardware **Bst**
stCECFu	CEC status **stCEC**

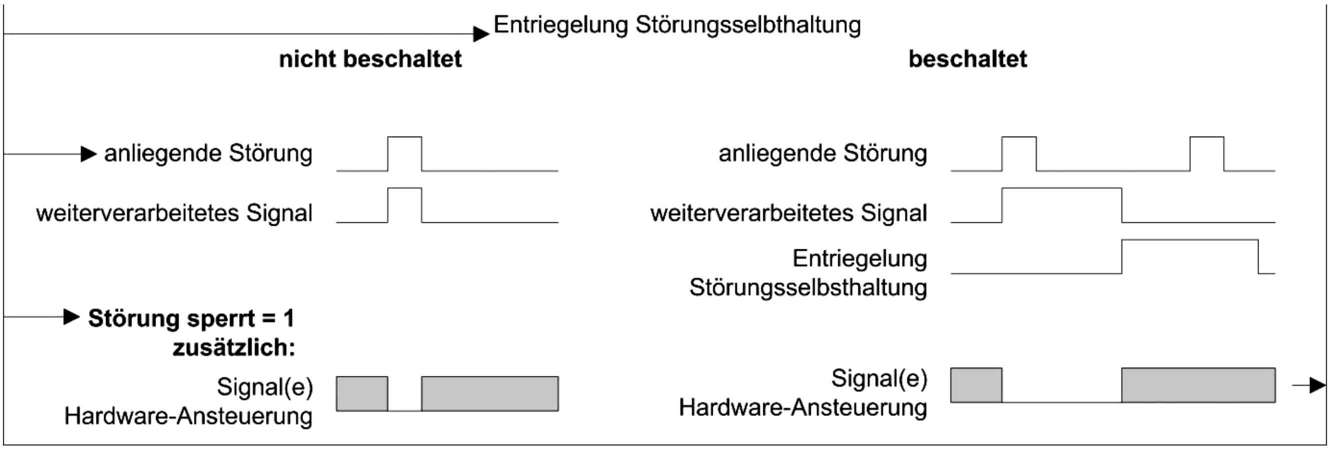
Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

Malfunction messages that occur **SM** and **SMFu** or **stCEC** and **stCECFu** may affect the operation of the switching outputs.

a) not at all(**"malfunction blocked"** = 0)
b) if the relevant outputs are switched off or changed (**"malfunction blocked"** = 1)

If the parameter **"malfunction pump blocked"** is set, a malfunction that occurs must switch off the outputs **"Pump FC ON"** and **"Pump Bypass ON"**.
If the parameter **"malfunction FC blocked"** is set the output **"Pump FC ON"** is switched off.
If the parameter **"malfunction FC requires bypass"** is set the output **"Pump bypass ON"** is activated when the automatic functions require the pump. In manual operation there is no automatic malfunction switch to bypass mode.
If a malfunction sets the output **"Pump FC ON"** to off or bypass operation is activated, this can only be reset by activating the **"unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
SM, SMFu **stCEC, stCECFu**	Release malfunction catch
SM	Malfunction(s) occurring
StLock	Malfunction blocked
PuFu, PuBy	Hardware control signal

Status control/switch priorities

The following input parameters influence the control of the outputs:
AnfAuto, Z(off/Fu on/bypass on) and Zs, DOL, Rep, Manual(off/Fu on/bypass on), Zw(off/on) and ZwSw, Rep, SM and SMFu

Priority	Parameter / Value	Impact
Highest	**Manual/open, Zw/open, Rep**	**PuFu** = 0, **PuBy** = 0

Priority	Parameter / Value	Impact
	SM, SMFu	Refer to "Trouble-shooting" section
	Manual/Fu On, Z/FC On, Zw/On	**PuFu** = 1, **PuBy** = 0 **Zw/On**: if no malfunction FC (**SMFu**): **PuFu** = 1, **PuBy** = 0 otherwise **PuFu** = 0, **PuBy** = 1 **ZwSw** vs. **Zs**: if **Zw/On** and **Z/FC On** are active, **ZwSw** is used as **Y**
	Manual/Bypass on	**PuFu** = 0, **PuBy** = 1
	DOL, Z/closed	**PuFu** = 0, **PuBy** = 0
	Z/Bypass on	**PuFu** = 0, **PuBy** = 1
lowest	**AnfAuto**	if **AnfAuto** = 1, then automatic operation

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

Manual influence

In this object "32 force control ZW" and "34 set point force control ZwSw" must be used for the manual influence.

4.3.3.34. H904 Pump BUS

Function summary

The "pump bus" function block controls a rev-controlled bus pump with a set point **Ptarget**. The function block supports:

- Minimum pump operation
- Operating hours / limiting value
- Switching delays
- Command execution check
- Pump blocking protection
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Begin Automatic operation	actual value deletable boolean	--	--	deleted	--
2	**Psoll** Pump setpoint	set point integer	0	100	0	%
3	**Pu** Pump ON	actual value boolean	--	--	0	--
5	**reg** Begin Control	actual value boolean	--	--	0	--
6	**Y** Pump setp. setting	actual value integer	0	100	0	%
7	**BM** Pump operation	actual value deletable boolean	--	--	deleted	--
8	**SM** Pump fault	actual value deletable boolean	--	--	deleted	--
9	**AnfMin** Begin Minimum oper.	actual value deletable boolean	--	--	deleted	--
10	**AnlVerz** Start delay Automatic	set point integer	0	2147483647	0	s
11	**PuMinEin** Minimum Oper. ON	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
12	**Bh** Operating hours	set point deletable integer	0	2147483647	deleted	h
13	**BhAktiv** Oper.hrs.cnt. activation	set point boolean	--	--	0	--
14	**BhGw** Oper.hrs. limit value	set point integer	0	2147483647	0	h
16	**DBE** Direct operating level active	actual value deletable boolean	--	--	deleted	--
17	**Hand** Manual switch	set point multistate	--	3	0	value,text 9,Auto 0,OFF 1,ON
18	**LzPBS** Pump blocking prot. run time	actual value integer	0	2147483647	0	min
19	**PuNach** Pump coasting	set point integer	0	120	0	min
20	**RMAna** RM Setting FU	actual value deletable integer	0	100	deleted	%
22	**ResSM** Unlock malfunction catch	actual value deletable boolean	--	--	deleted	--
27	**StSperr** Malfunction blocked	set point boolean	--	--	0	--
28	**StzPBS** Start time blocking prot.	set point integer	0	2147483647	0	min
29	**VzBAK** stBAK delayed	set point integer	0	2147483647	0	s
31	**Z** Z- influence	set point multistate	--	3	0	value,text 9,AUTO 0,Z-OFF 1,Z-ON
32	**ZW** Forced control	set point multistate	--	3	0	value,text 9,AUTO 0,FORCED OFF 1,FORCED ON
33	**Zs** Spoint Z-influence	set point integer	0	100	0	%

No.	name of parameter	parameter typ	min	max	init	unit
34	**ZwSw** Setpoint forced control	actual value integer	0	100	0	%
35	**gBh** Limit value error by opr.hrs.	actual value boolean	--	--	0	--
36	**pbs** Blocking prot. active	actual value boolean	--	--	0	--
37	**stBAK** Status pump command exe control	actual value boolean	--	--	0	--
39	**tBAK** Time BAK	set point integer	0	2147483647	30	s
40	**SMout** SMout	actual value boolean	--	--	0	--

Function description

Minimum pump operation

If the pump is in automatic mode and the input **AnfMin** is activated the pump is operated in a pump-specific minimum mode (usually minimal transport height (**"Minimal operation On"** = On).

Switching delays

It is possible to delay switching the pump on in automatic operation (**"Delay automatic start"**).
It is possible to delay switching the pump off in automatic operation (**"Pump hunting"**).

Pump blocking protection

The function block includes the "pump block protection" function. If the value 0 is entered for the **LzPBS** operating time this function does not work. The pump blocking protection switches the pump on with a fixed set point **Y** of 10%. The pump blocking protection only switches the pump on if this is not running at the switch on time and automatic operation is activated, **"Blocking protection active"** is set to 1 in this time.
The function block delivers an output signal **"request control"** that switches when the pump output and not the**"Blocking protection active"** is due.

Operating hours / limiting value

The pump operating hours can be counted, the operating time counter can **not** be preset but rather is only adopted by the pump hardware. The operating hours counter can be occupied with a limiting value. If the limiting value is exceeded a message is produced.

Note: The parameter names of the operating hours counter are different from those described in the "Repeating function elements" section.

Command execution check

The function block contains a command execution check (refer to the command execution check for description and parameters) for the actual operating status: **"Operating message pump"**, Target operating status: **"Pump ON"**, output: **"Status command execution check"**:
If the actual operating status is not switched no corresponding command execution check malfunction is signaled (**stCEC**).
"Release malfunction catch" resets the command execution check malfunction.
Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.
An adjoining malfunction**SM** or **stCEC** may influence the control of the **"Pump ON"** output.
a) not (**"malfunction blocked"** = 0)
b) the output **"Pump ON"** switches to "closed" (**"malfunction blocked"** = 1)
If a malfunction sets the output **"Pump ON"** to off, this can only be reset by activating the **"unlock malfunction catch"**.
If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.

Status control/switch priorities

The following input parameters influence the control of the outputs:
AnfAuto, Z(on/off) and Zs, DOL, manual(on/off), Zw(on/off) and ZwSw, SM

Priority	Parameter / Value	Impact
Highest	**SM**	Refer to "Trouble-shooting" section
	Zw/Off, Manual/Off	**Pu** = 0
	Manual/open, Zw/open	**Pu** = 1
	Z/closed, DOL	**Pu** = 0
	Z/On	**Pu** = 1
	AnfMin	if **AnfAuto** = 1, and **AnfMin** =1 then Min operation
lowest	**AnfAuto**	if **AnfAuto** = 1, then automatic operation

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.3.35. H905 Double pump

Function summary

The "double pump" function block controls a switchable double pump, and supports:

- pump switching (varies with operating hours, per switching parameter or for malfunctions)
- Operating hours / limiting value
- Switching delays
- Command execution check
- Pump blocking protection
- Malfunction catch / malfunction handling
- Status control unit using Z influence, DOL, manual influence, repair switch, forced control

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**AnfAuto** Begin Automatic operation	actual value deletable boolean	--	--	deleted	--
2	**Bh2** Oper.hrs. Pump 2	set point integer	0	2147483647	0	h
3	**Pu1** Pump 1 ON	actual value boolean	--	--	0	--
4	**Pu2** Pump 2 ON	actual value boolean	--	--	0	--
5	**reg** Begin Control	actual value boolean	--	--	0	--
7	**BM1** Operation msg pump 1	actual value deletable boolean	--	--	deleted	--
8	**SM1** Pump 1 fault	actual value deletable boolean	--	--	deleted	--
9	**Rep1** Repair switch pump 1	actual value deletable boolean	--	--	deleted	--
10	**AnlVerz** Startup delay of the automatic	set point integer	0	2147483647	0	s
11	**BM2** Operation msg pump 2	actual value deletable boolean	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
12	**Bh1** Oper.hrs. Pump 1	set point integer	0	2147483647	0	h
13	**BhAktiv** Oper.hrs.cnt. activation	set point boolean	--	--	0	--
14	**BhGw1** Oper.hrs. limit value pump 1	set point integer	0	2147483647	168	h
15	**PuUm** Pump switching	actual value deletable boolean	--	--	deleted	--
16	**DBE** Dir. oper. level active	actual value deletable boolean	--	--	deleted	--
17	**Hand** Hand switch AUTO	set point multistate	--	4	0	value,text 9,Auto 0,OFF 1,Pump1_ON 2,Pump2_ON
18	**LzPBS** Pump blocking prot. run time	set point integer	0	2147483647	0	min
19	**PuNach** Pump coasting	set point integer	0	120	0	min
20	**BhGw2** Oper.hrs. limit value Pump 2	set point integer	0	2147483647	168	h
21	**ResBh1** Reset oper.hrs. pump 1	actual value deletable boolean	--	--	deleted	--
22	**ResSM** Unlock Malfunction catch	actual value deletable boolean	--	--	deleted	--
23	**BhGwU** Pump switch-over limit value	set point integer	1	2147483647	72	h
24	**Rep2** Repair switch pump 2	actual value deletable boolean	--	--	deleted	--
25	**ResBh2** Reset oper.hrs. Pump 2	actual value deletable boolean	--	--	deleted	--
27	**StSperr** Malfunction blocked	set point boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
28	**StzPBS** Start time blocking prot.	set point integer	0	2147483647	0	min
29	**VzBAK** stBAK1 or stBAK2 delayed	set point integer	0	2147483647	0	s
30	**RzU** Rest time to switch-over	actual value integer	0	2147483647	0	min
31	**Z** Z- influence	set point multistate	--	4	0	value,text 9,Auto 0,OFF 1,Pump1_ON 2,Pump2_ON
32	**Zw** Forced control	set point multistate	--	3	0	value,text 9,Auto 0,OFF 1,ON
33	**SM2** Pump 2 fault	actual value deletable boolean	--	--	deleted	--
34	**UZeit** Overlap time	set point integer	0	2147483647	0	s
35	**gBh1** Limit value violation oper. hrs. pump 1	actual value boolean	--	--	0	--
36	**pbs** Blocking prot. active	actual value boolean	--	--	0	--
37	**stbak1** Command exe. control status pump 1	actual value boolean	--	--	0	--
38	**stbak2** Command exe. control status pump 2	actual value boolean	--	--	0	--
39	**tBAK** Time BAK	set point integer	0	2147483647	30	s
40	**gBh2** Limit value violation oper. hrs. pump 2	actual value boolean	--	--	0	--
41	**SMout** SMout	actual value boolean	--	--	0	--

Function description

Pump switching

If the input **"Pump switching"** is not switched operation changes between the two pumps in automatic mode and for **Zw/On** depending on the operating hours. For this the pump that is not running is activated when the operating time of the currently operating pump exceeds the **"limiting value pump switching"** since the last pump switching. At the same time **"Remaining time to switching"** is set to **"limiting value pump switching"** and starts to count down.
If the parameter **"Pump switching"** is switched, in automatic mode and for **Zw/On** the relevant pump is activated depending on the value of the parameter, **"Pump switching"**= 0 -> Pump 1, **"Pump switching"**= 1 -> Pump 2.
The malfunction-dependent pump switching is described in the trouble-shooting section; the input **"Pump switching"** has no influence on the malfunction-dependent pump switching.

Priorities for the various pump switchings

Highest priority
malfunction-dependent pump switching
parameter-dependent pump switching
operating time-dependent pump switching
Lowest priority

Switching delays

It is possible to delay switching the pump on in automatic operation (**"Delay automatic start"**).
It is possible to delay switching the pump off in automatic operation (**"Pump hunting"**).

When switching from **"Pump 1 On"** to **"Pump 2 On"** or vice versa the pump to be switched on is activated; the pump to be switched off still operates for the **"overlay time"** so as to prevent a fall in pressure when building up the pressure in the pump that is to be switched on.

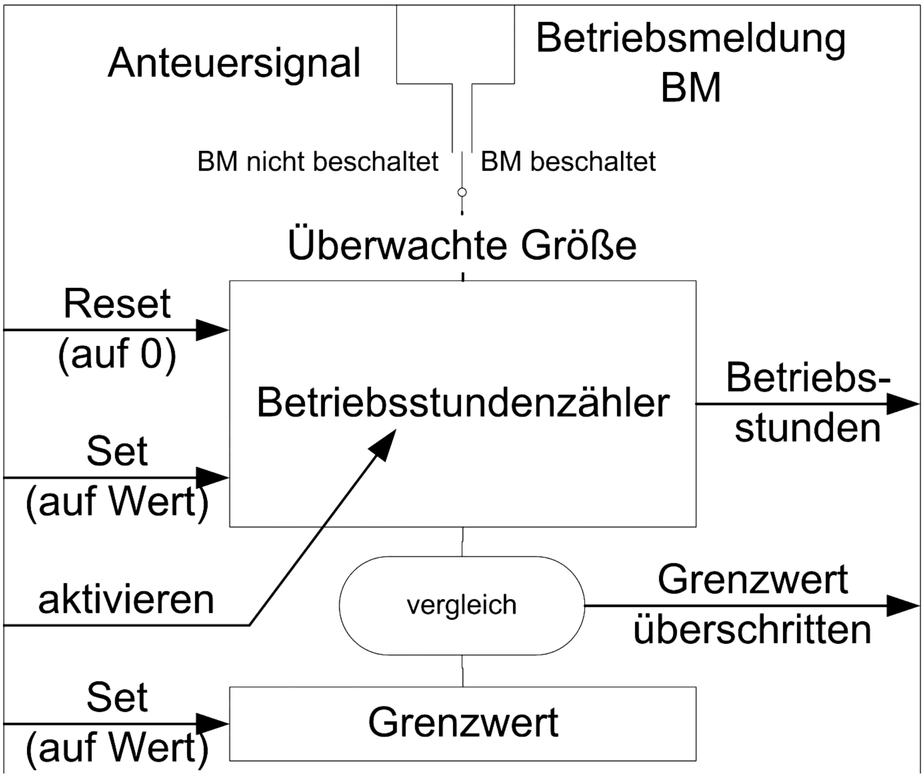
Pump blocking protection

The function block includes the "pump block protection" function. If the value 0 is entered for the **LzPBS** operating time this function does not work.

The pump blocking protection is only activated when neither of the two pumps is running at the switch on time and automatic mode is activated, **"Blocking protection active"** is set at this time to 1. Both pumps are subsequently switched on for a time by **"operating time pump blocking protection"**; the switching from pump 1 to pump 2 takes place without an **"overlay time"**.
The function block delivers an output signal **"request control"** that switches when the pump outputs and not the**"Blocking protection active"** are due.

Operating hours / limiting value

The operating hours of the pumps can be counted, the operating hours counter can be preset and occupied by a limiting value. If the limiting value is exceeded a message is produced. If the input for the relevant pump operating message is not switched the pump output is used for counting.

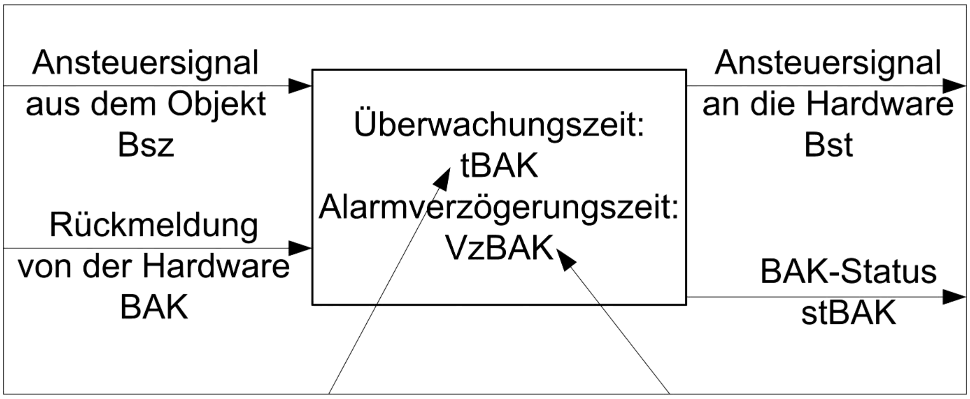


HWO parameter	corresponding general operating hour parameter
Pu1 or Pu2	Control signal
BM1 or BM2	Operating message
ResBh1 or ResBh2	Reset operating hours
Bh1 or Bh2	Set operating hours
BhActive	activate
BhGw1 or BhGw2	Set limiting value
Bh1 or Bh2	Operating hours
gBh1 or gBh2	Limiting value exceeded

Command execution check

The function block contains a command execution check (refer to the command execution check for description and parameters) both pumps for the actual operating status: **"Operating message pump 1 or 2"**, Target operating status: **"Burner 1 or 2 ON"**, output: **"Status pump command execution check 1 or 2"**.

If the actual operating status is not switched no corresponding command execution check malfunction is signaled (**stCEC1**or**stCEC2**).
"Release malfunction catch" resets the command execution check malfunction.
Note: The parameter names of the command execution check are different from those described in the "Repeating function elements" section.



HWO parameter	corresponding general CEC parameter
Pu1 or Pu2	Control signal from the object **Bsz**
BM1 or BM2	acknowledgement from hardware **CEC**
tCEC	Monitoring time **tCEC**
VzCEC	Alarm delay time **VzCEC**
Pu1 or Pu2	Control signal to the hardware **Bst**
stCEC1 or stCEC2	CEC status **stCEC**

Malfunction catch / malfunction handling

If **"unlock malfunction catch"** is wired malfunctions that occur are saved and can be reset by activating the **"unlock malfunction catch"**.

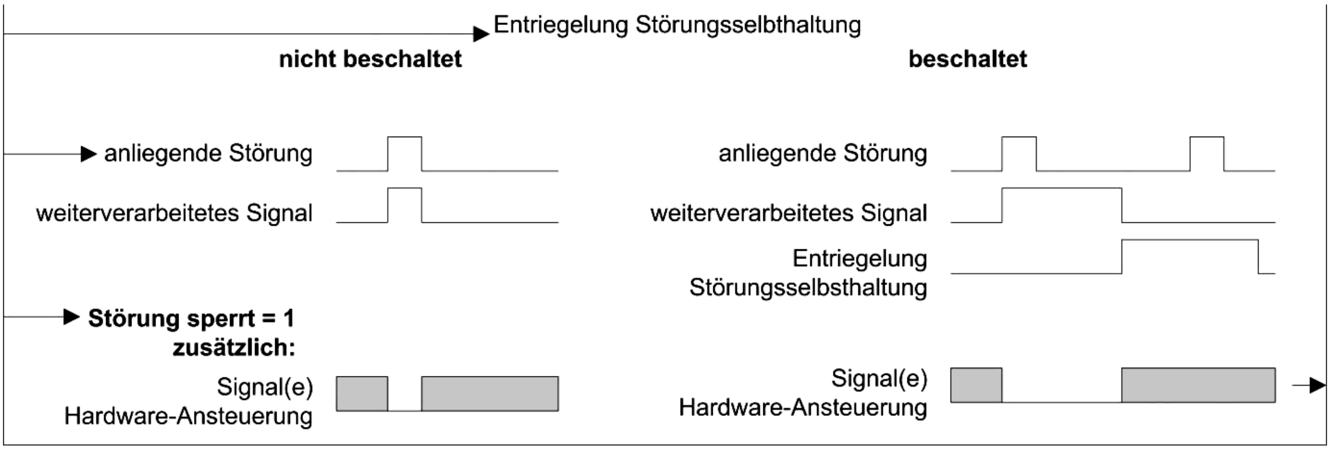
Malfunctions that occur **SM1** or **SM2** or **stCEC1** or **stCEC2** may influence the control of the outputs **"Pump 1 ON"** and **"Pump 2 ON"** as follows:

a) switches the pump that is not currently being used (**"malfunction blocked"** = 0)
b) switches the outputs **"Pump 1 ON"** and **"Pump 2 ON"** off (**"malfunction blocked"** = 1)

The switch due to a malfunction only occurs in automatic mode or for **Zw/On**.
When switching to the pump that is not currently being used the pump operating at the time of the malfunction is switched off after the end of the **"overlay time"**. If the malfunction is resolved (**SM1** or **SM2** and **stCEC1** or **stCEC2** returns again to 0), the pump requested at this time (refer to parameter-dependent pump switching or operational hours pump switching) is re-used to reset to this.

If the malfunction switches off the outputs **"Pump 1 ON",** and **"Pump 2 On"** this can only be reset by activating the **"release malfunction catch"**.

If **"unlock malfunction catch"** is not wired malfunctions that occur are not saved, i.e. if the malfunction disappears the malfunction handling disappears.



HWO parameter	corresponding general operating hour parameter
ResSM	Release malfunction catch
SM1 and SM2 **stCEC1 and stCEC2**	Malfunction(s) occurring
StLock	Malfunction blocked
Pu1 and Pu2	Hardware control signal

Status control/switch priorities

The following input parameters influence the control of the outputs:
AnfAuto, Z(off/pump 1 on/pump 2 on), DOL, manual(off/pump 1 on/pump 2 on), Zw(off/on), Rep1, Rep2, SM1, SM2

Priority	Parameter / Value	Impact
Highest	**Manual/Off, Zw/Off**	**Pu1** = 0, **Pu2** = 0
	Rep1, Rep2	**Rep1** = 1 -> **Pu1** = 0 **Rep2** = 1 -> **Pu2** = 0
	SM	Refer to "Trouble-shooting" section **"Malfunction blocked"** = 1: **Pu1** = 0, **Pu2** = 0 **!!! "Malfunction blocked"** = 0): As per malfunction dependent pump switching pump is only activated for automatic operation or **Zw/On**
	Manual/Pump 1 on, Manual/Pump 2 on	**Pu1** = 1, **Pu2** = 0 **Pu1** = 0, **Pu2** = 1
	Zw/On	Pump is activated as per pump switching

Priority	Parameter / Value	Impact
	Z/closed, DOL	**Pu1** = 0, **Pu2** = 0
	Z/Pump 1 on, **Z/Pump 2 on**	**Pu1** = 1, **Pu2** = 0 **Pu1** = 0, **Pu2** = 1
lowest	**AnfAuto**	if **AnfAuto** = 1, then automatic operation

"Status command execution check ..." malfunctions that occur are not reset by "non-automatic" operation.

4.3.4. Basic objects (flags, timers, AE, AA, BE, BA)

Basic objects are e.g. markers, timers and switches. Following short descriptions and parameters.

object no.	name of object	release stage: 24.07.2006
L	Lamp	0.1.9
M	Marker	0.1.9
P	Pin	0.1.9
S	Switch	0.1.9
S_11	ON/OFF switch	0.1.9
S_12	ON/OFF switch	0.1.9
S_21	AUTO/MAN ON/OFF	0.1.9
S_22	AUTO/ON	0.1.9
S_23	MANUAL/OFF	0.1.9
S_31	AUTO/ON/OFF	0.1.9
S_32	AUTO/MANUAL 1/2EA	0.1.9
S_41	AUTO/0/1/2	0.1.9
S_42	AUTO/0/D/N	0.1.9
S_51	AUTO/0/T/N/Heatg	0.1.9
T	Timer	0.1.9

4.3.4.1. BO L - Lamp

To control an LED on a module.

Function summary

Dieses Objekt repräsentiert eine LED auf der Frontblende eines Moduls. Wobei die "Frontblende" als Darstellungselement von physikalischen als auch logischen Blenden zu sehen ist (SBM21 oder ein Bildschirm der Oberfläche im Bereich Kunden des Gerätes). Die Funktionalität einer Lampe wurde aus dem DDC3000 System übernommen und für die logische Darstellung erweitert. Es werden ungültige und gelöschte Werte über die Lampen in der entsprechenden Darstellungsform ausgegeben.

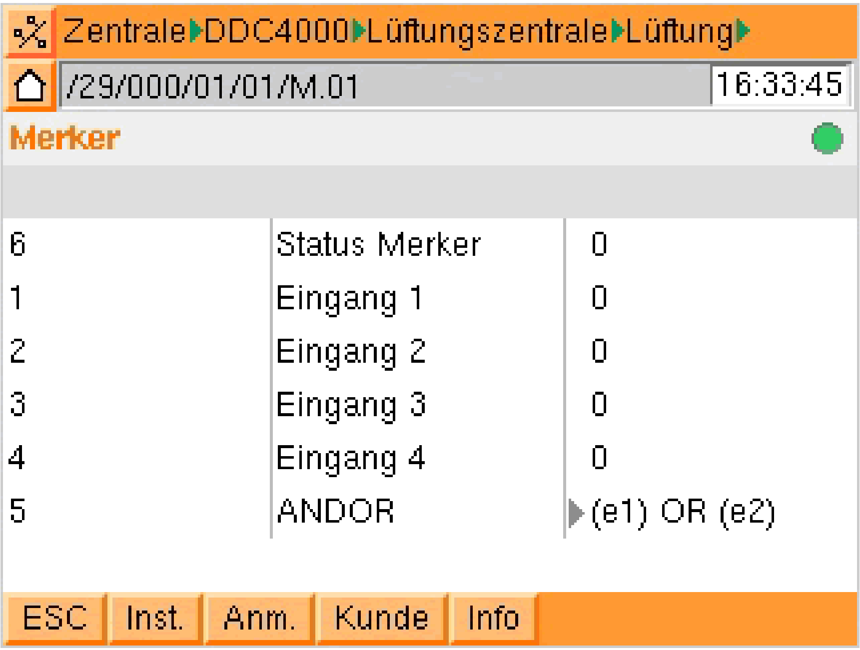
Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**I** State	actual value boolean	--	--	0	--
2	**Q D** Permanent light	actual value deletable boolean	--	--	0	--
3	**Q B** Blinking light	actual value deletable boolean	--	--	0	--
4	**Farbe** Color selection	set point multistate	--	8	0	value,text 0,Red-RedOFFBl 1,Green-RedOFFBl 2,Green-Red 3,Green-Yellow 4,Yellow-Red 5,undefined 6,undefined 7,undefined

4.3.4.2. BO M - Markers

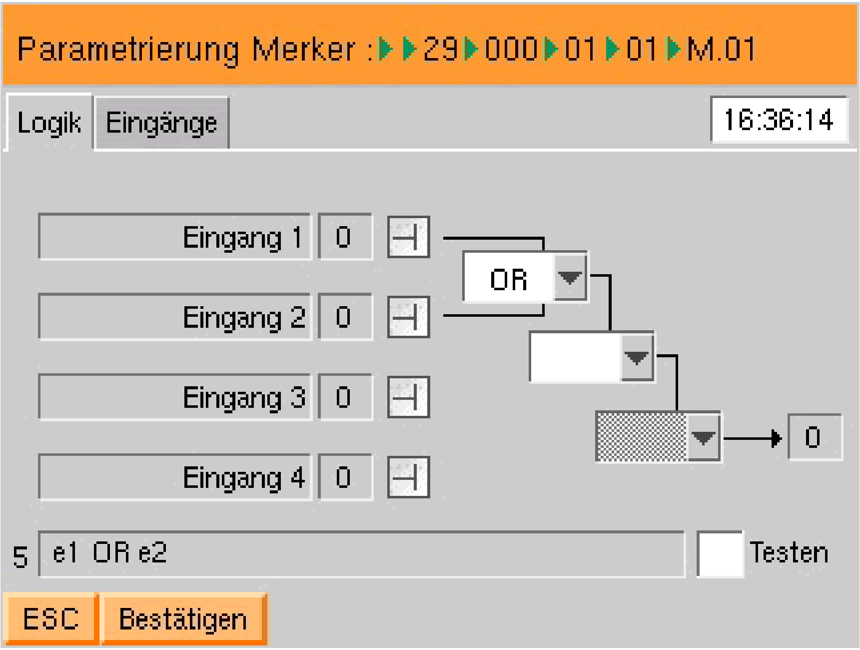
Function summary

This object represents a control link (marker). Variable:= e1 e2 e3 e4 m Expressions OR, AND, NOT, XOR, brackets ([ ]) are optional parts of the link.

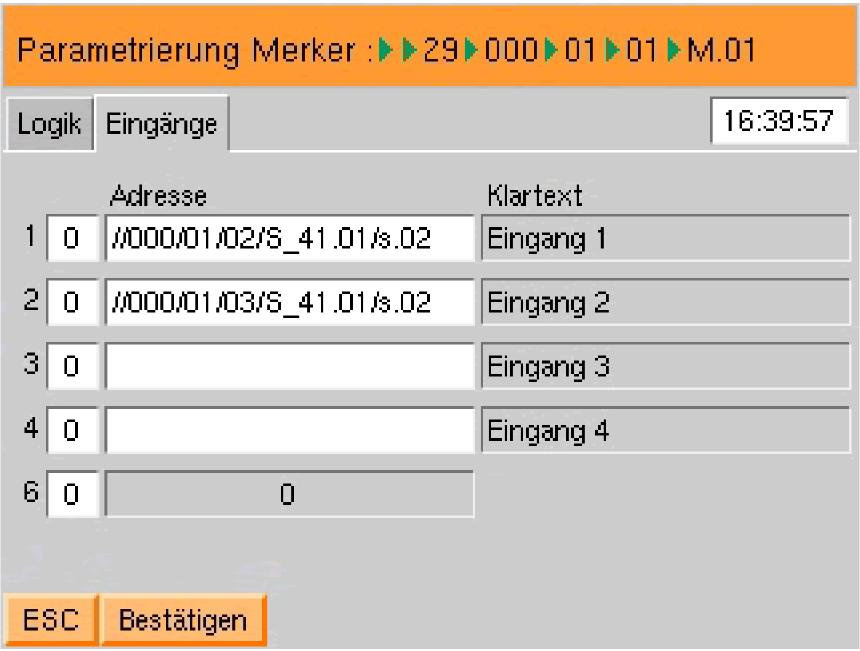


Depiction of the marker's parameters (Version 0.3.33 and 1.0.x)

The marker is displayed better from Version 1.1.xx.



same marker with clearer depiction



If the "inputs" flap is pressed the technician can view all the inputs with their source assignments at a glance.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**E1** Input 1	actual value deletable boolean	--	--	0	--
2	**E2** Input 2	actual value deletable boolean	--	--	0	--
3	**E3** Input 3	actual value deletable boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
4	**E4** Input 4	actual value deletable boolean	--	--	0	--
5	**V** Vector	set point text	--	--		--
6	**m** Status marker	actual value boolean	--	--	0	--

4.3.4.3. BO P - Pin

Function summary

Das Pin-Objekt steht für eine I/O-Klemme. Über den Parameter, der hinter Par_Config steht, wird ein Subobjekt installiert. Je nach Subobjekt werden genau die Möglichkeiten eines analogen Einganges, eines analogen Ausganges, eines binären Einganges oder eines binären Ausganges angeboten. Welche Funktionen möglich sind, hängt vom übergeordneten Modul-Objekt ab, das die Möglichkeiten des betreuten Busmoduls (oder der IO-Karte) kennt. Es sorgt dafür, dass die Auswahl-Möglichkeiten bezüglich der Subobjekte eingeschränkt werden. Der Parameter hinter Par_Config bestimmt, welches Subobjekt angehängt wird: 0 = kein Subobjekt = keine Funktion 1 = CDI = Binärer Eingang 2 = CDO = Binärer Ausgang 3 = CAI = Analoger Eingang 4 = CAO = Analoger Ausgang.

The function of a PINS is stipulated by attaching a sub-object e.g. CAI for analog input.

For this depending on the hardware of the PIN it is possible to select several sub-objects.

For example, a PIN can be an output that can then be read back.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Typ** Pin type selection	set point multistate	--	5	0	value,text 0,no function 1,Binary input 2,Binary output 3,Analog input 4,Analog output
2	**AN** Pin type selection	set point multistate	--	3	0	value,text 0,no function 3,Analog input 4,Analog output
3	**AI** Pin type selection	set point multistate	--	2	0	value,text 0,no function 3,Analog input

No.	name of parameter	parameter typ	min	max	init	unit
4	**AO** Pin type selection	set point multistate	--	2	0	value,text 0,no function 4,Analog output
5	**DN** Pin type selection	set point multistate	--	3	0	value,text 0,no function 1,Binary input 2,Binary output
6	**DI** Pin type selection	set point multistate	--	2	0	value,text 0,no function 1,Binary input
7	**DO** Pin type selection	set point multistate	--	2	0	value,text 0,no function 2,Binary output
8	**Kn** Pin connection	set point deletable text	--	--	deleted	--

4.3.4.4. BO S - Switches

Function summary

Is there for the sake of completeness. This switch aims to integrate the switches of the SBM into the DDC4000 system.

Jede der Tasten auf den Modulen kann als Taster (T), Schalter (S) oder als Teil einer Schaltergruppe mit gegenseitiger Auslösung definiert werden.
Schaltergruppen bestehen aus mindestens 2 aufeinanderfolgenden Schaltern. Die Schaltergruppen werden der Reihe nach durchnummeriert. Nach Anwahl des entsprechenden Parameters lassen sich die Tasten in ihrer Funktion festlegen.

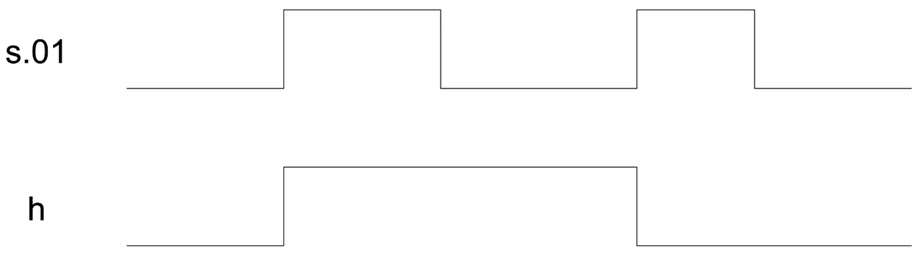
Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Type** Type	set point multistate	--	18	0	value,text 0,Push-button switch 1,Switch 2,Group_1 3,Group_2 4,Group_3 5,Group_4 6,Group_5 7,Group_6 8,Group_7 9,Group_8 10,Group_9 11,Group_10 12,Group_11 13,Group_12 14,Group_13 15,Group_14 16,Group_15 17,Group_16
2	**s** Switch Status	set point deletable boolean	--	--	deleted	--

4.3.4.5. BO S_11 - Switch single stage ON/OFF

Function summary

Ein einstufiger Schalter mit dem Text EIN/AUS - Eltako-Funktion (rastender Taster).



Parameters

No.	name of parameter	parameter typ	min	max	init	unit
h	**hand** Switch Status	actual value multistate	--	2	0	value,text 0,MANUAL OFF 1,MANUAL ON
s.01	**s.01** ON/OFF	set point boolean	--	--	0	--

4.3.4.6. BO S_12 - Confirmation switch

Function summary

A sensor with confirmation function. Resets to 0 after 1 second.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
h	**hand** Switch Status	actual value multistate	--	2	0	value,text 0,OFF 1,Receipt
s.01	**s.01** Receipt	set point boolean	--	--	0	--

4.3.4.7. BO S_21 - 2 push-button MANUAL/AUTO, ON/OFF

Function summary

Dieser Schalter hat die Funktion, mit dem ersten Knopf Auto/Hand und mit dem zweiten Knopf Ein/Aus zu schalten.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
h	**hand** Switch Status	actual value multistate	--	3	2	value,text 9,AUTO 1,Manual ON 0,Manual OFF
s.01	**s.01** AUTO/Manual	set point boolean	--	--	0	--
s.02	**s.02** OFF/ON	set point boolean	--	--	0	--

4.3.4.8. BO S_22 2 push-buttons AUTO, Manual On

Function summary

Eine Schaltergruppe mit 2 Schaltern:

- Zustand Taste 1 AUTO
- Zustand Taste 2 EIN

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
h	**hand** Switch Status	actual value multistate	--	2	0	value,text 9,AUTO 1,ON
s.01	**s.01** AUTO	set point boolean	--	--	1	--
s.02	**s.02** MANUAL ON	set point boolean	--	--	0	--

4.3.4.9. BO S_23 (as 22)

Function summary

Eine Schaltergruppe mit 2 Schaltern:

- Zustand Taste 1 AUTO
- Zustand Taste 2 AUS

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
h	**hand** Switch Status	actual value multistate	--	2	0	value,text 0,MANUAL OFF 9,AUTO
s.01	**s.01** AUTO	set point boolean	--	--	0	--
s.02	**s.02** Manual OFF	set point boolean	--	--	1	--

4.3.4.10. BO S_31 - 3 push-buttons AUTO, Manual off, Manual on

Function summary

Eine Schaltergruppe mit 3 Schaltern:

- Zustand Taste 1 AUTO
- Zustand Taste 2 HAND AUS
- Zustand Taste 3 HAND EIN

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
h	**hand** Switch Status	actual value multistate	--	3	0	value,text 9,AUTO 0,MANUAL OFF 1,MANUAL ON
s.01	**s.01** AUTO	set point boolean	--	--	1	--
s.02	**s.02** MANUAL OFF	set point boolean	--	--	0	--
s.03	**s.03** MANUAL ON	set point boolean	--	--	0	--

4.3.4.11. BO S_32 - 3 push-buttons AUTO/manual, Level1 ON/OFF, Level 2 ON/OFF

Function summary

Eine Schaltergruppe mit 3 Schaltern:

- Zustand Taste 1 AUTO/HAND
- Zustand Taste 2 STUFE1 EIN/AUS

- Zustand Taste 3 STUFE2 EIN/AUS

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
h	**hand** Switch Status	actual value multistate	--	4	1	value,text 9,AUTO/MANUAL 0,OFF 1,MANUAL ON LEV 1 2,MANUAL ON LEV 2
s.01	**s.01** AUTO/MANUAL	actual value boolean	--	--	0	--
s.02	**s.02** MANUAL LEV 1	actual value boolean	--	--	0	--
s.03	**s.03** MANUAL LEV 2	actual value boolean	--	--	0	--

4.3.4.12. BO S_41 - 4 Push-buttons AUTO, OFF, Manual Level 1, Level 2

Function summary

Eine Schaltergruppe mit 4 Schaltern:

- Zustand Taste 1 AUTO
- Zustand Taste 2 AUS
- Zustand Taste 3 HAND STUFE 1
- Zustand Taste 4 HAND STUFE 2

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
h	**hand** Switch Status	actual value multistate	--	4	0	value,text 9,AUTO 0,OFF 1,MANUAL ON LEV 1 2,MANUAL ON LEV 2
s.01	**s.01** AUTO	set point boolean	--	--	1	--
s.02	**s.02** OFF	set point boolean	--	--	0	--
s.03	**s.03** MANUAL ON LEV 1	set point boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
s.04	**s.04** MANUAL ON LEV 2	set point boolean	--	--	0	--

4.3.4.13. BO S_42 - 4 Push-buttons AUTO, DAY, NIGHT, OFF

Function summary

Eine Schaltergruppe mit 4 Schaltern:

- Zustand Taste 1 AUTO
- Zustand Taste 2 Fern Tag
- Zustand Taste 3 Fern Nacht
- Zustand Taste 4 Fern Aus

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
h	**hand** Switch Status	actual value multistate	--	4	0	value,text 9,Remote Auto 0,Remote OFF 1,Remote Day 35,Remote Night
s.01	**s.01** AUTO	set point boolean	--	--	1	--
s.02	**s.02** DAY	set point boolean	--	--	0	--
s.03	**s.03** NIGHT	set point boolean	--	--	0	--
s.04	**s.04** OFF	set point boolean	--	--	0	--

4.3.4.14. BO S_51 - 5 Push-buttons Auto, off, Manual Level 1, 2, 3

Function summary

Eine Schaltergruppe mit 5 Schaltern:

- Zustand Taste 1 AUTO
- Zustand Taste 2 AUF
- Zustand Taste 3 TAG
- Zustand Taste 4 NACHT
- Zustand Taste 5 Aufheizen

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
h	**hand** Switch Status	actual value multistate	--	5	0	value,text 9,Z AUTO 0,Z-OFF 1,Z DAY 35,Z NIGHT 36,Z Heating
s.01	**s.01** AUTO	set point boolean	--	--	1	--
s.02	**s.02** OFF	set point boolean	--	--	0	--
s.03	**s.03** DAY	set point boolean	--	--	0	--
s.04	**s.04** NIGHT	set point boolean	--	--	0	--
s.05	**s.05** HEATING	set point boolean	--	--	0	--

4.3.4.15. BO T - Timer

Function summary

Die Timer können von 1 Sekude bis 35999 Sekunden (99:59:59) jeweils Einschalt- und/oder Ausschaltverzögert eingestellt werden.
Die Startzeit wird in Parameter Tstart **SzT** angezeigt. Timer können während ihrer Laufzeit durch eine erneute Triggerung (auf 0 gesetzt und) neu gestartet werden.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
e	**E** Input	actual value deletable boolean	--	--	0	--
f	**f** f	set point multistate	--	3	0	value,text 0,Timer 1,Switch-on impulse 2,On/Off switch impulse
reset	**ResT** Reset Timer	set point boolean	--	--	0	--
t	**t** Status Timer	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
Toff	**VzA** Switch-off delay	set point integer	0	359999	0	s
Ton	**VzE** Switch-on delay	set point integer	0	359999	0	s
Tstart	**SzT** Start time	actual value deletable integer	0	2147483647	deleted	s

4.3.5. System objects

4.3.5.1. System objects

The system objects are located in plant "0" of the DDC Central Unit and are used for general settings. Network structures are stipulated here and the peripherals are also administrated (fax, modem, printer ...)

object no.	name of object	release stage: 24.07.2006
SY_BACnet	External BACnet	0.4.0
SY_B_AI	Ext. BACnet AE	0.4.0
SY_B_AO	Ext. BACnet AA	0.4.0
SY_B_AV	Ext. BACnet AW	0.4.0
SY_B_BI	Ext. BACnet DE	0.4.0
SY_B_BO	Ext. BACnet DA	0.4.0
SY_B_BV	Ext. BACnet DW	0.4.0
SY_CAN	CAN Bus	0.1.9
SY_Central	Central	0.1.9
SY_Clock	System time	0.1.9
SY_Config	System configuration	0.1.9
SY_D4DML	Def.data	unreleased
SY_D4PML	Planning	0.1.9
SY_Datsi	save data	unreleased
SY_DDC110	SY_DDC110	unreleased
SY_DDC3000	DDC3000 operating	unreleased
SY_DSub	D-SUB config	unreleased
SY_Email	Email	0.3

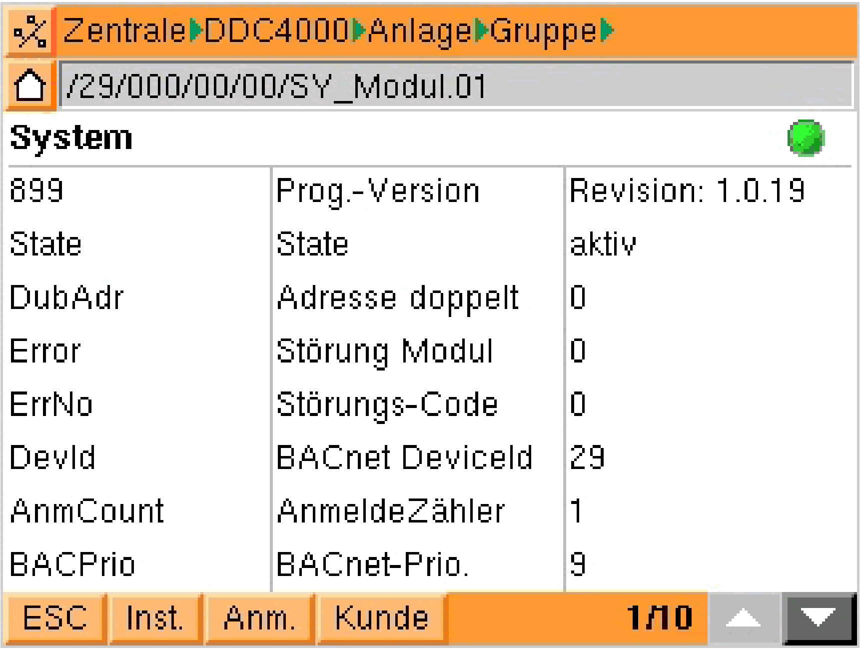
object no.	name of object	release stage: 24.07.2006
SY_ExtCent	ext.Central Unit	unreleased
SY_FAX	FAX	0.2.0
SY_FBM38	System FBM38	0.4.0
SY_FBM48	System FBM48	unreleased
SY_File	File	unreleased
SY_Hosts	Hosts	0.2.0
SY_I18N	Localisation	unreleased
SY_Lon	System LON	unreleased
SY_ModConf	Modem-Config.	0.4
SY_Modul	System	0.1.9
SY_MsgMan	Message_Storage	0.1.9
SY_MsgOut	Message output	0.3
SY_Network	Network config.	0.2.0
SY_Printer	Printer	unreleased
SY_Route	Route	unreleased
SY_SBM51	System SBM51	0.2.0
SY_SBM52S	System SBM52S	unreleased
SY_Serial	ser. Interface	0.4.0
SY_Shadow	Shadow	unreleased
SY_Simu	Simulation value	1.0.4
SY_SMS	SMS	0.2.0
SY_Stat	Statistics	unreleased
SY_TelChar	TelCosts Limit	0.4.0
SY_Trace	Trace	unreleased
SY_TrMan	Trend storage	unreleased
SY_User	Usergroup	unreleased

4.3.5.2. SY_Module Module settings general

Function summary

This system object contains the setting parameters above all that are important for each DDC Central Unit (BMR) and also bus modules (IO cards).

This includes in particular the software version number in parameter 899 and the Bacnet device ID.



Parameters

No.	name of parameter	parameter typ	min	max	init	unit
899	Prog. Version	actual value text	--	--	Revision: Head	--
AnmCount	LogonCounter	actual value integer	-2147483648	2147483647	0	--
BACPrio	BACnet-Prio.	set point integer	1	16	9	--
DevId	BACnet DeviceId	set point integer	0	4194303	0	--
DubAdr	Address double	actual value boolean	--	--	0	--
ErrNo	Fault Code	actual value integer	0	2147483647	0	--
Error	Fault module	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
HwRev	HardwareVersion	actual value text	--	--	-.-	--
SetFree	Send release	set point boolean	--	--	1	--
State	State	actual value multistate	--	3	2	value,text 0,passive 1,active 99,virtual

BACPrio: The parameter describes the priority used to change a DDC parameter.

The following peculiarity is important:

If parameters are changed via the DDC interface, priority 9 applies to it for example.

Then it is stipulated that the DDC should be given priority 10. If the BACPrio parameter is now set to 10 all the values changed in the DDC are moved to priority 10.

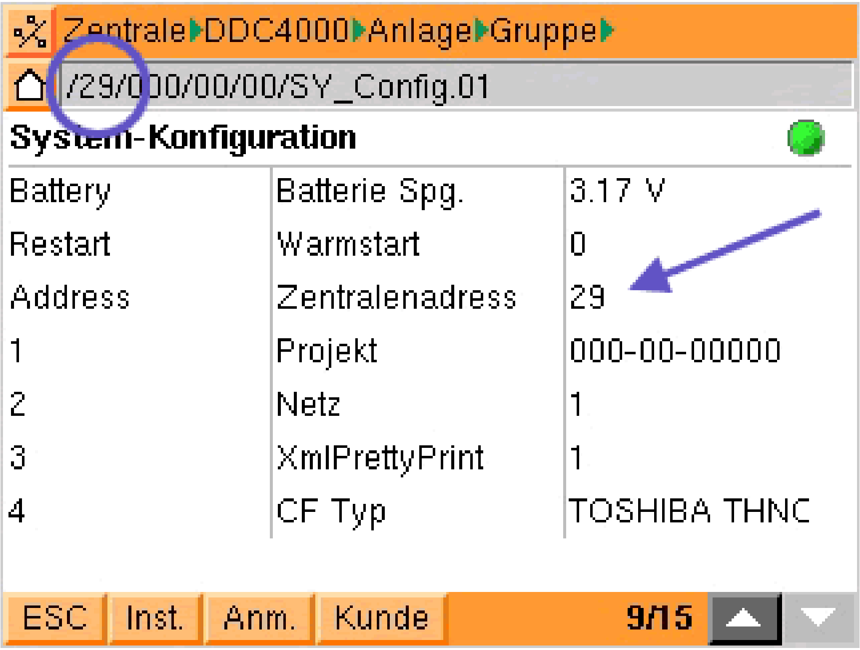
Warning! This may mean that superordinate setting commands etc. take sudden effect if their priority is now larger.

4.3.5.3. SY_Config plant configuration

Function summary

DDC central parameters can be viewed (internal temp) and set in this object.

The most important parameter here is the central unit address. Many program process are based on this address so if it is changed a **cold start** is required.



The screen shot is from Version 1.0.19. Here the "network" and "XMLPrettyPrint" parameters are found in the object. These two parameters will not be available in future versions.

Parameters

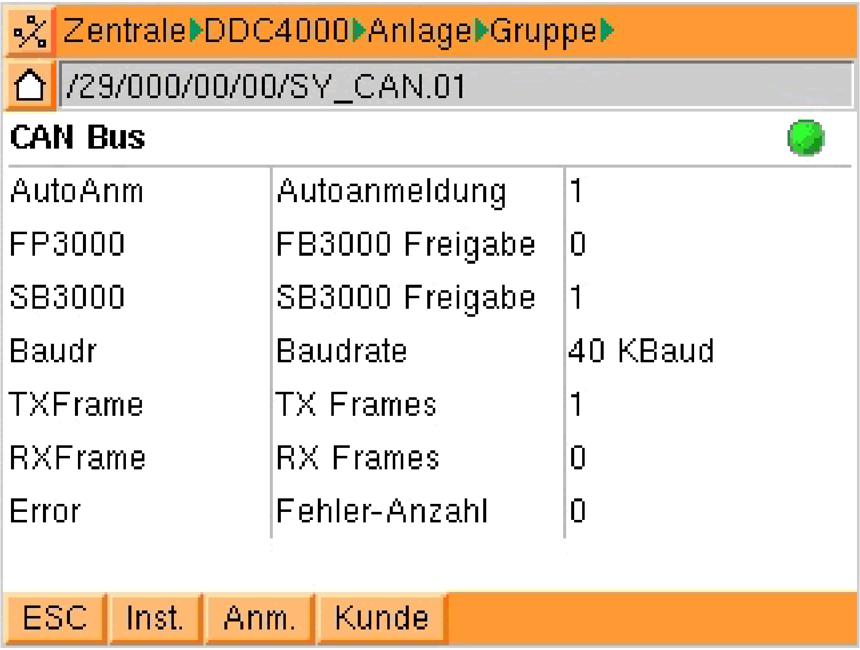
No.	name of parameter	parameter typ	min	max	init	unit
3	**XmlPret** XmlPrettyPrint	set point boolean	--	--	0	--
4	CF Type	actual value text	--	--		--
Address	Central U address	set point integer	1	99	1	--
Battery	Battery voltage	actual value float	-infinity	+infinity	0	V
BeepD	ToneDuration	set point integer	0	5000	60	ms
Brightn	Brightness	set point integer	10	100	98	%
CalA	Calibration A	set point integer	-2147483648	2147483647	0	--
CalB	Calibration B	set point integer	-2147483648	2147483647	0	--
CalC	Calibration C	set point integer	-2147483648	2147483647	0	--

No.	name of parameter	parameter typ	min	max	init	unit
CalD	Calibration D	set point integer	-2147483648	2147483647	0	--
CalE	Calibration E	set point integer	-2147483648	2147483647	0	--
CalF	Calibration F	set point integer	-2147483648	2147483647	0	--
CalS	Calibration S	set point integer	-2147483648	2147483647	0	--
dbg0	Internal	set point text	--	--		--
Hostnam	Host name	actual value text	--	--	DDC4000.01	--
Logserv	Logserver	set point deletable text	--	--	deleted	--
Restart	Warm start	set point boolean	--	--	0	--
Temp	Inside temperature	actual value float	-infinity	+infinity	0	C
Voltage	Backup Voltage	actual value float	0	5	0	V

4.3.5.4. SY_CAN CAN bus

Function summary

This object is used to configure the CAN busses.



This defines whether a bus supports Field bus modules or BMD/BMA.

This object can be set twice. Index 1 is responsible for the first bus - Index 2 for the second.

Parameters

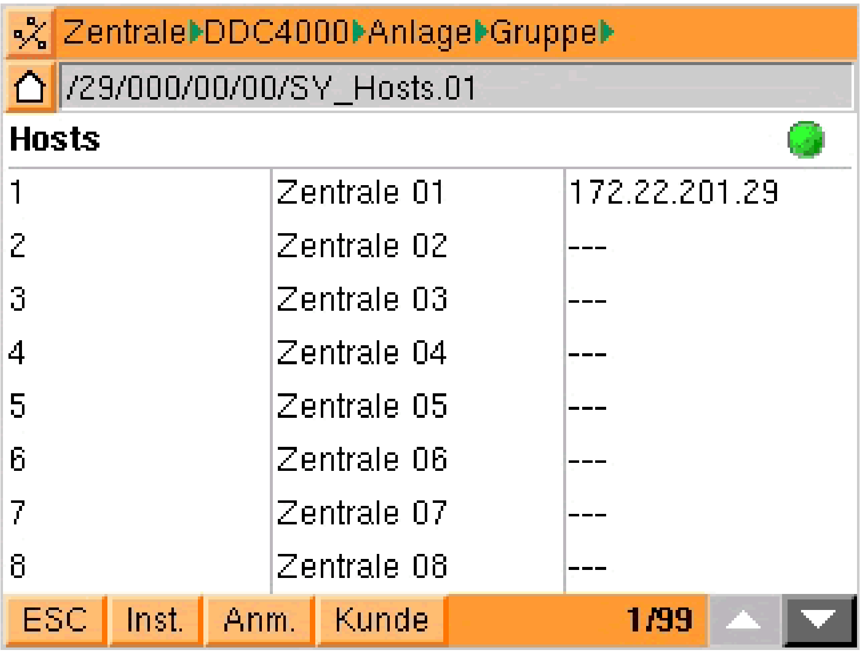
No.	name of parameter	parameter typ	min	max	init	unit
AutoAnm	Auto logon	set point boolean	--	--	1	--
Baudr	Baud rate	set point multistate	--	3	0	value,text 1,20 KBaud 2,40 KBaud 3,80 KBaud
Error	Error count	actual value integer	0	2147483647	0	--
FP3000	FB3000 Release	set point boolean	--	--	0	--
Mode	Mode	set point boolean	--	--	0	--
RXFrame	RX Frames	actual value integer	0	2147483647	0	--
SB3000	SB3000 Release	set point boolean	--	--	0	--
TXFrame	TX Frames	actual value integer	0	2147483647	0	--

*	Nr.	Beschreibung
1)	AutoAnm	Ist dieser Parameter auf true, werden alle an diesem Can-Bus vorhandenen Module automatisch Angemeldet. Ist dieser Parameter false, werden nur projektierte Module Angemeldet.
2)	Baudr	Es sind 3 verschiedene Baudraten zulässig im System, hier können für den CAN-Bus diese gewählt werden.
3)	Error	Errors ist ein Statistik-Parameter. Er zeigt die Anzahl der vom CAN-Controller gemeldeten Fehler an. Es ist die Summe der BUS-OFFs.
4)	FP3000	Die Zentrale kann mehrere Protokolle gleichzeitig auf dem CAN-Bus bearbeiten, hiermit kann die Funktion des DDC3000 Feldbusses "EIN" oder "AUS" geschaltet werden.
5)	RXFrame	RX Frames ist ein statistik Parameter. Er zeigt die Anzahl empfangener Frames an.
6)	SB3000	Die Zentrale kann mehrere Protokolle gleichzeitig auf dem CAN-Bus bearbeiten, hiermit kann die Funktion des DDC3000 Schaltschrankbusses "EIN" oder "AUS" geschaltet werden.
7)	TXFrame	TX Frames ist ein statistik Parameter. Er zeigt die Anzahl gesendeter Frames an.

4.3.5.7. SY_Host

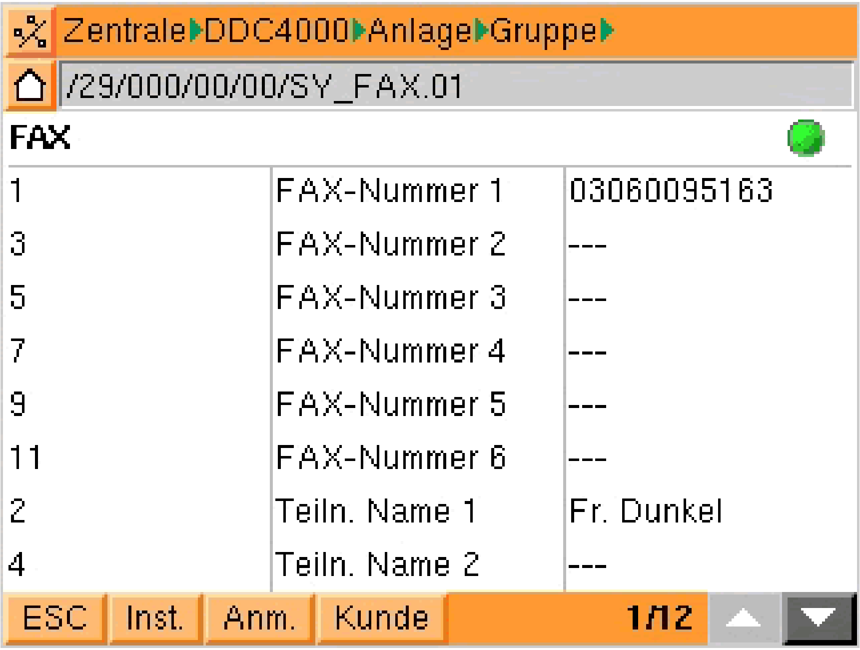
In SY_Host all possible 99 DDC Central Units are saved with their related IP addresses. Only when a DDC Central Unit is saved here can it be reached via a remote control and through superordinate parameterizing.

For the entries to become valid the Ethernet should be switched off and on again after a change (as of Version 1.10.19)

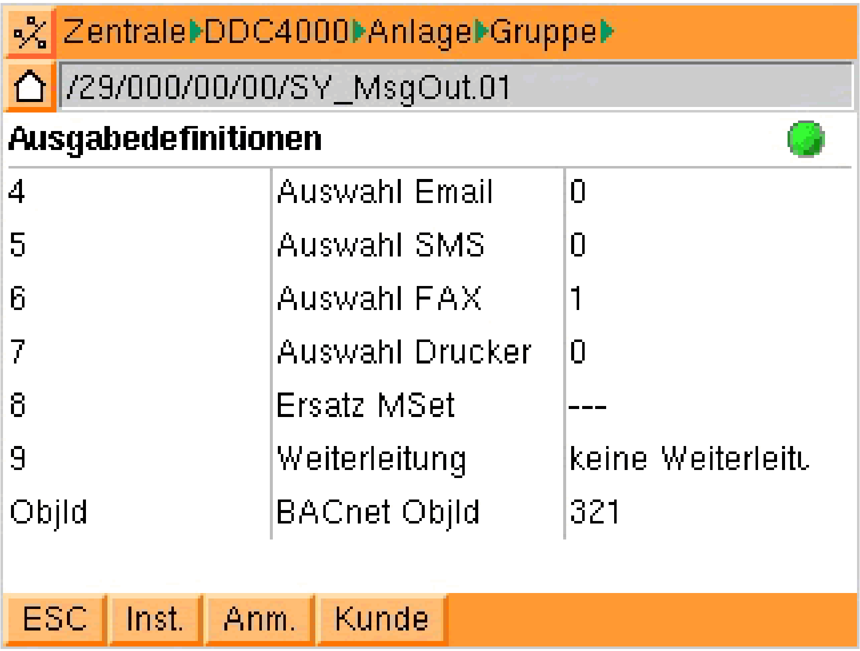


4.3.5.8. SY_FAX

The fax system object is used to stipulate the fax numbers that are to be dialed via a message.



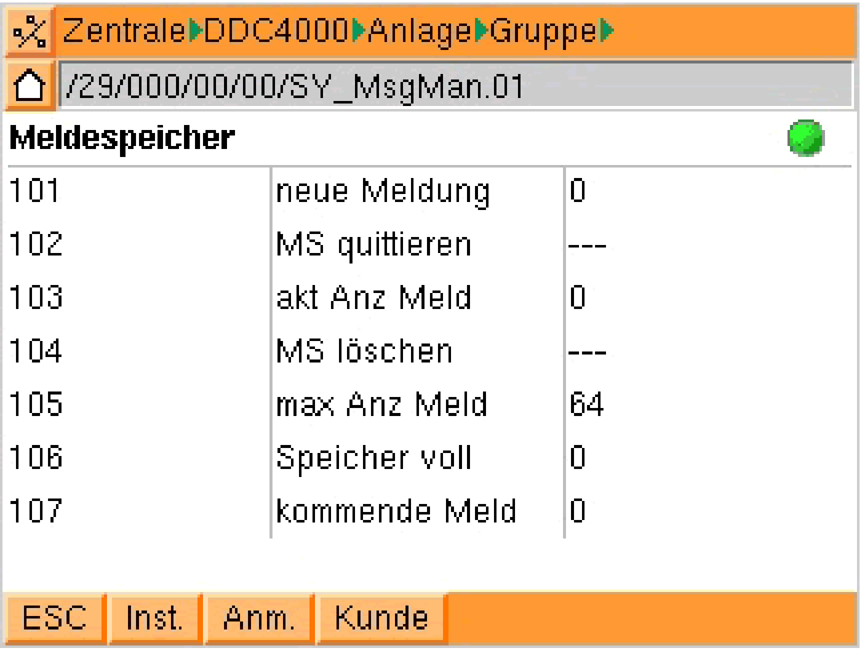
The corresponding fax number is used via the output definition (SY_MsgOut) relating to the message.



For this please observe a special binary coding. Refer to SY_MsgOut.

4.3.5.9. SY_MsgMan

This system object is to be used for setting up the message memory. With the aid of the possible settings here the size of the memory can be stipulated and the messages deleted.



Via "Quit MS" you can confirm messages that have accumulated. Entry must be set briefly to 1.

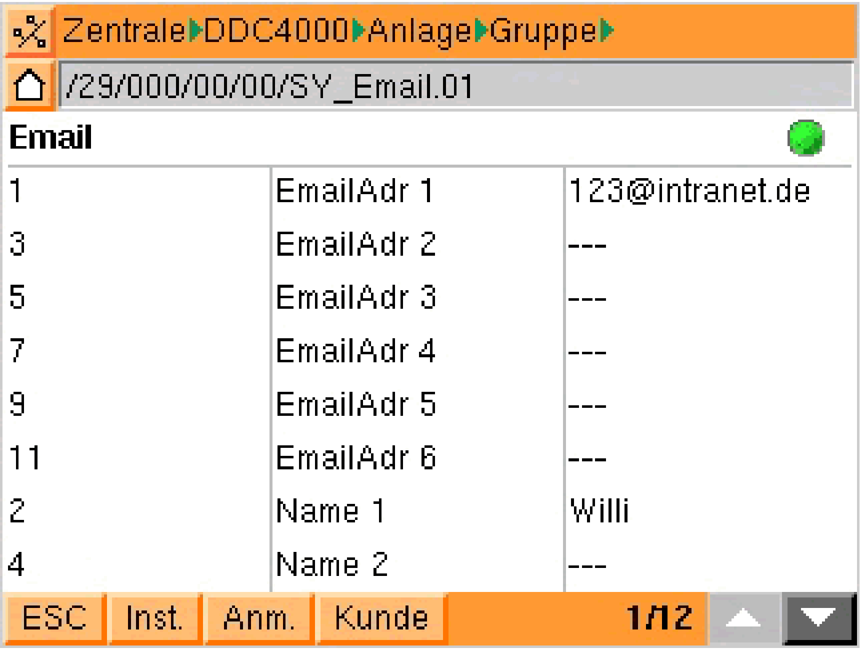
Via "Delete MS " you can delete all message pairs (malfunction and normal messages). Entry must be set briefly to 1.

A small trick for deleting the memory: set memory size to 1 - then the memory only holds 1 message. Mark this with a normal message and delete.

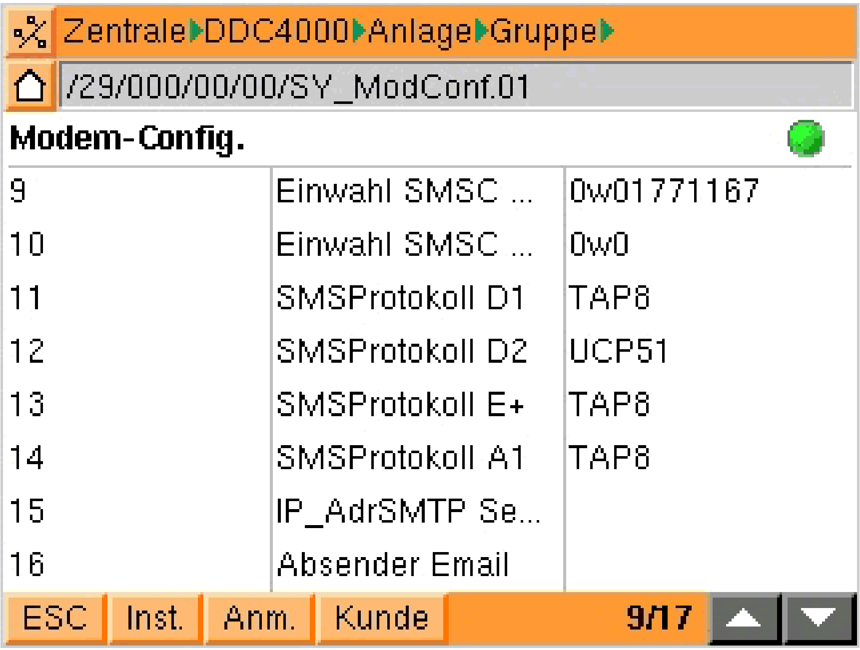
A new value message can be connected via "new message".

4.3.5.10. SY_EMAIL

As in SY_FAX you can stipulate addresses for the output here. Under "name" there should be a user name for simpler identification.



The SMTP address is set in SY_ModConf. (Version 1.0.19)



Up to version 1.2 there will only be the option of sending a mail within an intranet. The Internet dialing procedure and the required authentification algorithms have not been implemented yet.

4.3.5.11. Sy_Clock

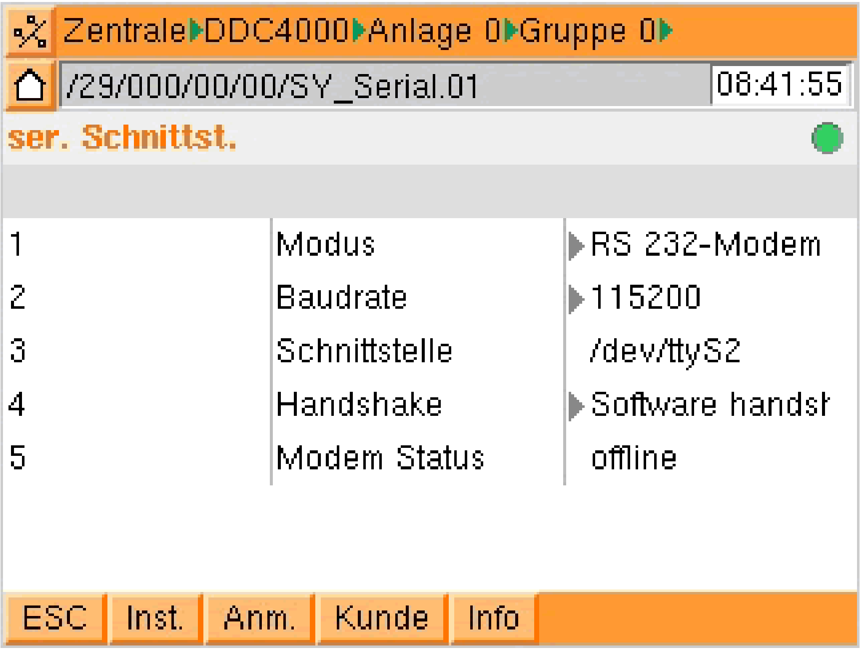
In Sy_Clock (plant time) you can enter the time zone and current time.
By entering the time zone you define whether the clock is altered for summer/winter time.

Entering the date

4.3.5.12. SY_Serial

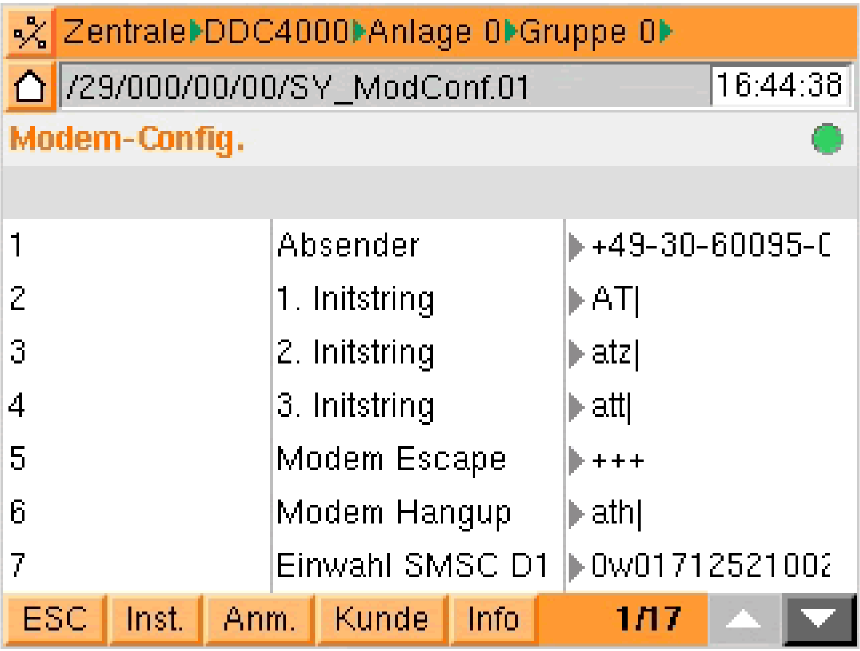
SY_Serial (Modem operation)

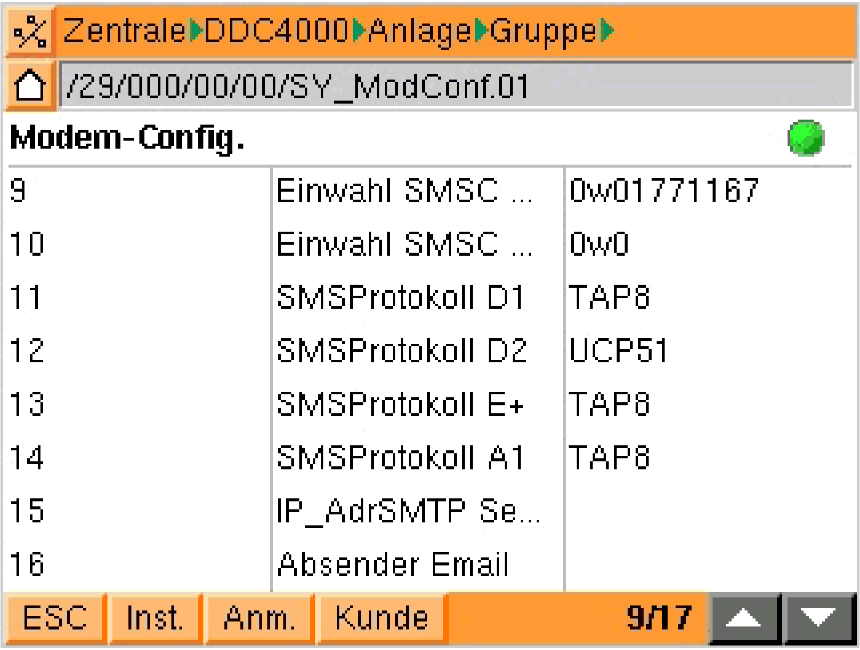
Go to "ser. interf.".
In the "mode" parameter enter a "3" for RS232 modem. (1 means inactive).
Or from Version 1.1.X select "RS232 modem".



4.3.5.13. Sy_ModConf

The modem access is configures in the SY_ModConf system object.





Hier kann für den jeweiligen SMS-Provider das Protokoll eingestellt werden.
Z.B. Parameter 9 Einwahl SMSC E+

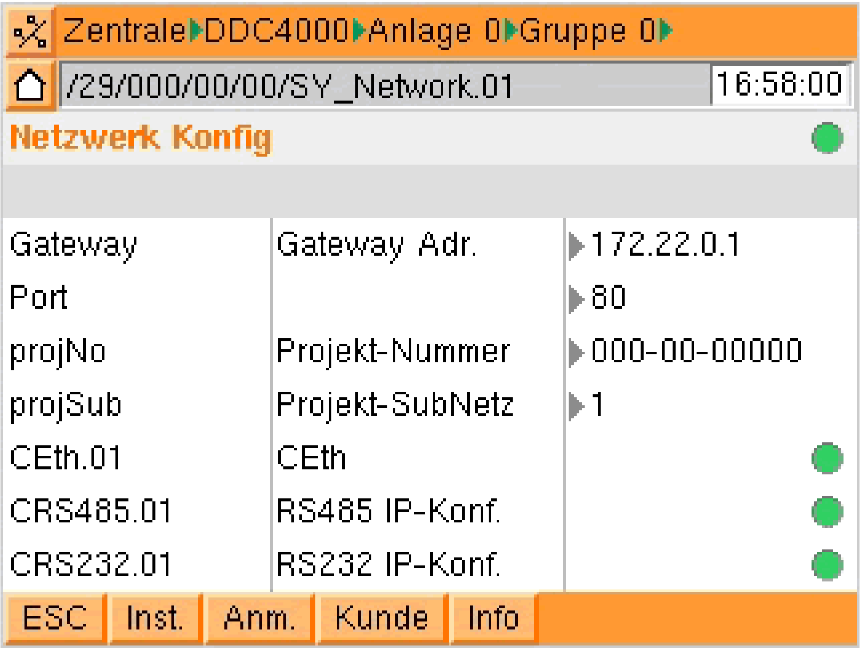
Hier wird die Einwahlnummer angegeben.

Z.B. Parameter 13 SMSProtokoll E+

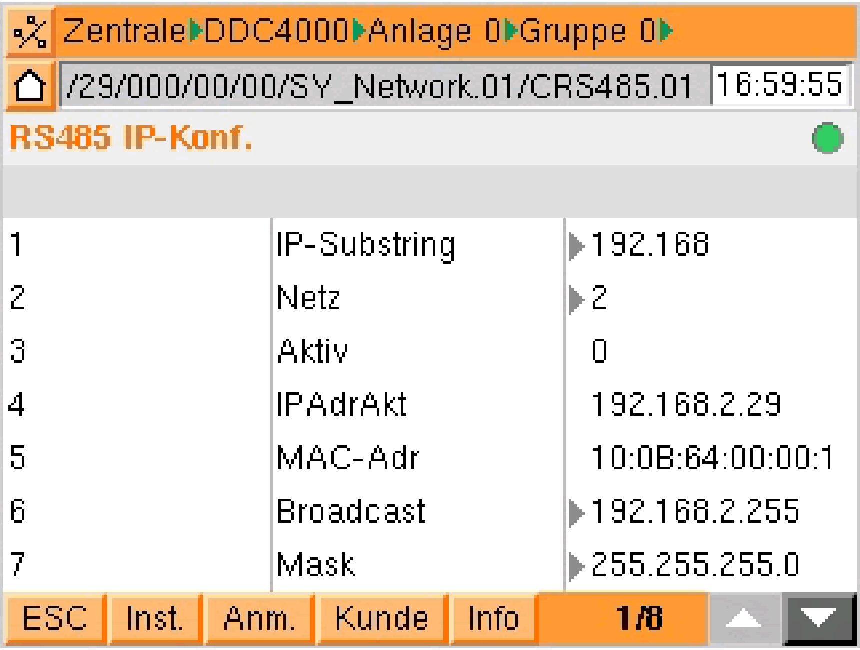
Hier kann das benutzte Protokoll umgestellt werden. Zur Zeit (Version 1.1) sind 2 Protokolle implementiert.
Außerhalb Deutschlands kann hier das Protokoll eingestellt werden und in den Einwahlnummern die ortsübliche Nummer.

4.3.5.14. SY_Network

The network interfaces are configured in this object.



Below you can see the setting options for the J-Y(St)Y network. The "2" default setting for the sub-network can be seen.



The active IP address is visible in parameter "4". It is comprised of "1" the IP sub-string, the network "2" and the DDC Central Unit address.
If the network or network administrator stipulates another IP, a special IP address can be stated in parameter "8".

If an IP changes, the network switches itself off automatically (Version 1.0 + 1.1).

4.3.6. Attachment functions

Function objects

To expand (influence) parameters function objects (F_**) etc. are used. This should for example enable a parameter to be scaled without losing the reference to an output parameter.

object no.	name of object	release stage: 24.07.2006
F001	Polynomial	0.1.43
F002	Operating hours	0.1.9
F003	Input limit	0.4.0
F004	Self holding	0.4.0
F005	Command execution check	0.4.0
F006	Damping	0.2.0
F007	Delay	0.2.0
F008	Limit value monitoring	0.1.9
F009	Blocking protection	0.2.0
F010	Block prot. st.	0.2.0
F011	Z-contact	unreleased
F012	Scaling	unreleased
F013	Simulation	1.0.4
F014	Inverting	0.3.33
F015	Counter	unreleased
F016	Replace value	unreleased
F017	Object status	0.1.9
F019	Adjustment	0.4.0
FAIMO	Sensor over	0.2.0
FB_AI	BACnet Analog-Input	0.2.0
FB_AO	BACnet AA	0.2.0
FB_AV	BACnet Analog Value	0.2.0
FB_BI	BACnet Binary-Input	0.2.0
FB_BO	BACnet BA	0.2.0
FB_BV	BACnet BV	0.2.0

object no.	name of object	release stage: 24.07.2006
FB_IR	BACnet message	unreleased
FB_MI	BACnet Multistate-Input	0.2.0
FB_MO	BACnet MA	0.2.0
FB_MV	BACnet MW	0.2.0
FB_TR	Trend	unreleased
FDest	Destination	0.1.9
FMSG	message	0.1.9
FSelMO	Selection signal set	0.1.9
FSource	Source	0.1.9

4.3.6.1. F001 Scaling

Function summary

This object has parameters that are used for scaling the target parameter. The calculated "new" value is entered in the current value of the target parameter.

F001 Skalierung kann an einem Float Parameter installiert werden. Mit dem Polynom $y = Ax^2 + Bx + C$ wird der Parameter skaliert.

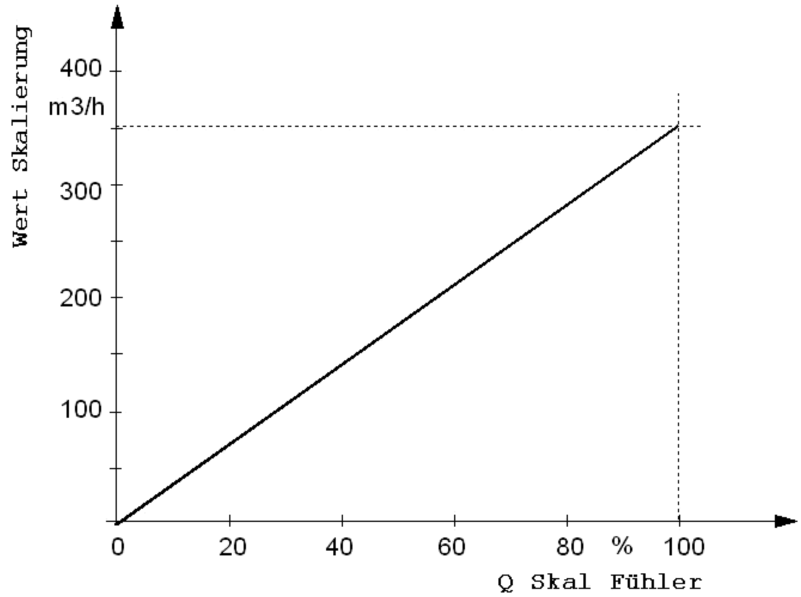
Bsp.: Eine Fühlerkorrektur von 1,5 K hätte folgende Einstellung. A=0.0, B=1.0, C=1.5 Bsp.: Ein 0-10 V Eingang auf den Bereich -20 bis +20 skaliert A=0.0, B=4.0, C=-20.0

Function description

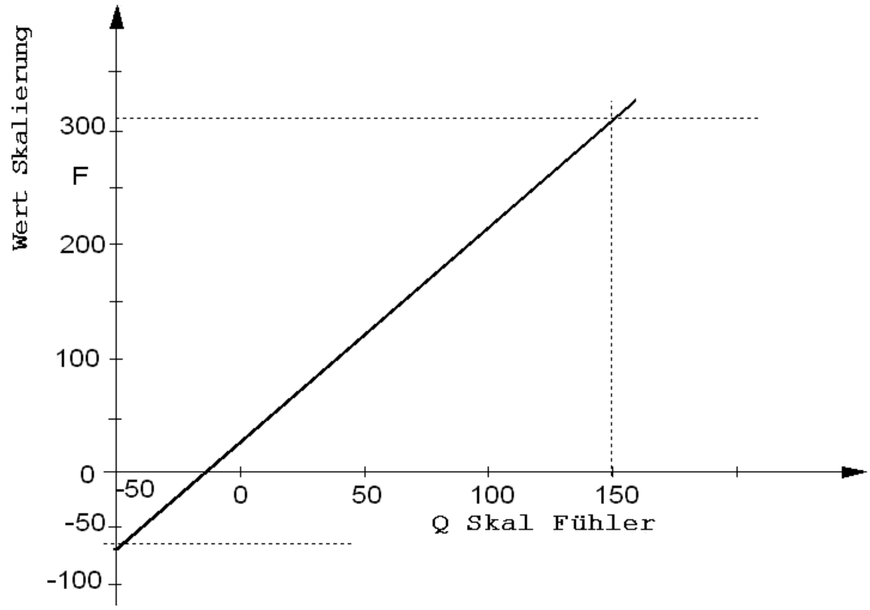
The function object F001 Scaling assign a new value range to an analog signal. The value range is defined by a start and an end value.
The scaling refers to the value range of the input magnitude. The "**start scaling"** and "**End scaling"** parameters stipulate the value range. The scaled value is provided directly to the object output of the relevant, analogue value.

Example 1:
A 0..10V signal should be converted to 0..350 m³/h

(depicted as 0..100%)
Start of range 0.0 (0%)
End of range 350.0 (100%)
unit m³/h



Example 2:
Any analog signal should be calculated in Fahrenheit
Start of range -58.0 (=-50°C)
End of range 302.0 (= 150°C)



Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**A** AX2	set point float	-infinity	+infinity	0	--
2	**B** BX	set point float	-infinity	+infinity	1	--
3	**C** C	set point float	-infinity	+infinity	0	--

4.3.6.3. F003 Limitation

Function summary

This object has parameters that are used for limiting the target parameter. The calculated "new" value is entered in the current value of the target parameter. The limitation is used for analog values.

e.g. the customer should be able to set set point <xs> only between 19 ... 23°C although the value range envisages a greater range of values for the parameter <xs>.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
OG	**GWO** Upper limit value	set point float	-infinity	+infinity	0	--
UG	**GWU** Lower limit value	set point float	-infinity	+infinity	0	--

4.3.6.4. F004 catch

Function summary

Used to maintain a status of a parameter. The setting of another parameter releases the status of the parameter that is to be retained on which the catch works.

Function description

Die Selbsthaltung kann nur an einen Parameter vom Typ "Boolean" angehängt werden. Dies bewirkt, wenn der Parameter auf "1" wechselt, dass er durch die Selbsthaltung auf diesem Wert bleibt, bis ein separates Rücksetzsignal (Reset Störungsselbsthaltung) aktiviert wird. Erst nach Quittierung der Änderung durch diese binäre Quelle wird der neue Wert gültig.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**res** Reset SH	set point boolean	--	--	0	--

4.3.6.5. F005 Command execution check

Function summary

Sie dient der Überwachung von binären Betriebs-Ist-Zuständen. Ein Betriebs-Ist-Zustand (oder Betriebsmeldung) muss innerhalb einer bestimmten Zeit **tCEC** dem Wert eines Betrieb-Soll-

Zustandes entsprechen, anderenfalls wird ein binärer Ausgang **FehlerBA**K auf 1 gesetzt. Ist der Betriebs-Ist-Zustand nicht beschaltet, wird kein FehlerCEC signalisiert. Der **FehlerCEC** wird zurückgesetzt, wenn der **ResCEC**-Eingang von 0 auf 1 wechselt. Ist der ResCEC-Eingang nicht beschaltet, wird FehlerCEC zurückgesetzt, wenn der Betriebs-Ist-Zustand dem Betriebs-Soll-Zustand wieder entspricht. Die 0/1-Flanke von FehlerCEC wird um die Zeit **VzCEC** verzögert ausgegeben. (siehe Pkt. 4.3.3.4 CEC)

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**reset** Reset	set point deletable boolean	--	--	deleted	--
2	**zeit** Time	set point integer	1	60	10	s
3	**Fehler** Error input	set point deletable boolean	--	--	deleted	--
4	**Aktor** Feedback	set point deletable boolean	--	--	deleted	--

4.3.6.6. F006 Damping

Function summary

This object has parameters that are used for damping the target parameter. The calculated "new" value is entered in the current value of the target parameter.

Function description

Es kann eine Beruhigung eines analogen Signals, z.B. eines Fühlerwertes, realisiert werden. Der Parameter „tn“ wirkt dabei wie ein PT1-Glied. Ändert sich der Wert des Eingangssignals sprunghaft, so wird nach der Dämpfungszeit eine Änderung des Wertes von 63% des ursprünglichen Eingangssprunges erreicht.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**tn** tn(63%)	set point deletable integer	1	3600	deleted	s

4.3.6.7. F007 Delay

Function summary

This object can be installed on Boolean and multistate parameter types. Delays the setting of a value when the mode changes.

Clarification:
You can change the previous value for multistate parameters without having to change the subsequent value.

Example:
Fan is to be switched from level 1 to level 2. But two statuses may not be active at the same time.
The following statuses are possible: 0=OFF, 1=Level1, 2=Level2
<u>1st step</u>: Parameter status 1 "active"
à change to the control
<u>2nd step</u>: Parameter status 1 "passive"
à time delay
Step 3: Parameter status 2 "passive"
Step 4: Parameter status 2 "active"

Hinweis: Die Verzögerungen werden in Sekunden parametriert. (Die Basiswerte für die Schaltzeiten sind Null Sekunden - womit eine zeitliche Verzögerung nicht wirksam ist!)
Typischer Anwendungsfall: Merker für Lichtsteuerung.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
tnOff	**tnAus** Switch-off delay	set point integer	0	3600	0	s
tnOn	**tnEin** Switch-on delay	set point integer	0	3600	0	s

4.3.6.9. F017 Object status

"Object status" defines what the LEDs in the superordinate groups and plants should display. (auch im Anlagen-Schnellzugriff der Kundenansicht)

Function summary

Wird ein Objektstatus gesetzt, so gilt für den Objektstatus aktiv bzw. nicht aktiv jeweils ein Zustand. Ein Objektstatus besitzt somit immer ein Zustandspaar.

1. Zustandspaar: Auto/Hand setzbar durch F017 Status "Hand"
2. Zustandspaar: Ein/Aus setzbar durch F017 Status "Anlage Ein" bzw. "Anlage Aus"

Der unter Status gewählte Zustand tritt ein, wenn der logische Zustand des Parameters dem Input-

Parameter entspricht. Ist das nicht der Fall, so gilt der entsprechend andere Zustand des Statuspaares.

Beispiel:

Ein Objektstatus am Parameter hat für den Input-Parameter den Wert "1" und für den Status-Parameter den Wert "Anlage Ein"
Ist der Parameter "1", so gibt der Objektstatus den Zustand "Ein" aus. Der Zustand "Aus" wird ausgegeben, wenn der Parameter den Wert "0" annimmt.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
Input	**Input** Input valus	set point integer	0	1023	1	--
State	**Status** Status	set point multistate	--	4	0	value,text 1,Plant ON 2,Plant OFF 3,Automatic 4,Manual

4.3.6.12. FSelMO Selection message set

Function summary

(for each 99x can be set to any scalable parameters). This object activates the message monitoring of a scalar parameter. The object described below *SY_MsgMan.01* is used as a message memory. If the monitored parameter is a BoolPar 0 or 1 can be defined as a ok. If an integer or float is monitored, the limiting value and switch back difference is stated for releasing a normal message.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**MSet** Selection MSet	set point deletable text	--	--		--

No.	name of parameter	parameter typ	min	max	init	unit
2	**überw** Monitoring open	set point multistate	--	8	2	value,text 0,no monitoring 1,Switch to 0 2,Switch to 1 3,Exceeding 4,Falling below 5,Equality 6,Exceed or below 7,Invalid
3	**E/A** On / Off	set point deletable boolean	--	--	deleted	--
4	**oGw** Upper limit value	set point float	-infinity	+infinity	95	--
5	**Xdz** Switchback diff	set point float	0	+infinity	1	--
6	**Txt_K** Text coming	set point multistate	--	17	6	value,text 0,Controller damaged 1,Winter 2,Manual 3,active 4,abnormal 5,Maintenance 6,Malfunction 7,Alarm 8,Danger 9,Initial. 10,Optimization 11,ON 12,CLOSE 13,too low 14,too high 15,too hot 16,too cold
7	**Txt_G** Text going	set point multistate	--	8	4	value,text 0,Controller OK 1,Summer 2,Auto 3,inactive 4,normal 5,Normal operation 6,OFF 7,OPEN
8	**Delay** Delay	set point deletable integer	0	3600	deleted	s

No.	name of parameter	parameter typ	min	max	init	unit
9	**uGw** Lower limit value	set point float	-infinity	+infinity	0	--
10	**Testw** Test value	set point integer	-2147483648	2147483647	0	--
101	**u** Signaling output	actual value boolean	--	--	0	--
102	**Status** internal Status	actual value multistate	--	6	0	value,text 0,Start 1,1. Success msg active 2,normal 3,Error msg active 4,Failure 5,Success msg active

4.3.6.13. FAIMO Sensor monitoring

Function description

(settable 99 times) The functional object FO_AnalogInputMessageOutput is used to monitor the sensor and generate sensor failure messages. For this purpose it is to be attached to the "b" parameter of a CO_AnalogInput. As such events as sensor breaking, short circuit, poling etc. are detected from this object only the validity of the "b" value is monitored but not whether limiting values are exceeded or undershot.
No sensor failure message is generated if the value of "b" has become invalid due to a module failure (or I/O card failure). Alternatively: sensor failure messages only make sense for registered modules (or I/O cards).
If a general failure monitoring is desired for all sensors within the central unit each related Type CO_AnalogInput object should have a FO_AnalogInputMessageOutput attached.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**MSet** Selection MSet	set point deletable text	--	--	deleted	--
2	**E/A** ON / OFF	set point deletable boolean	--	--	deleted	--
101	**u** Signaling output	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
102	**Status** internal Status	actual value multistate	--	6	0	value,text 0,Start 1,1. Logon running 2,Logged on 3,Logoff running 4,Logged off 5,Feedback running
201	**Delay** Delay	set point integer	1	3600	600	s
202	**MTxt** Message text	actual value multistate	--	5	0	value,text 0,OK 1,Malfunction 2,Short-circuit 3,Sensor break 4,wrong poles

4.3.6.14. Set parameters

4.3.6.14.1. FSource

Function summary

This object has a source parameter type. Entries can be made in this parameter as per the general conditions of the source parameter type. The value of the source parameter is transferred to the value of the target parameter.

Hinweis: Das Objekt kann auf analoge und digitale Parameter angewendet werden. Es realisiert eine Verbindung zu systemweiten Datenpunkten innerhalb der DDC-Zentralen.
Ausnahmen sind Ausgänge von Soft- und Hardware- sowie Basisobjekten.

Unit:
If the target parameter has its own unit, this is displayed. If the unit is deleted (ZERO), the unit of the source parameter is displayed.

Parameter text:
If the target parameter has a set text (not default), this is displayed as the parameter text. If this is not the case, the source parameter text is displayed.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
s	**Q** Source address	actual value reference	--	--	--	--

4.3.6.14.3. F013 Simulation value

Function summary

This object has a target parameter type (property as set point). A value that affects the target parameter can be entered in this parameter. The "simulation value" object is deleted automatically after a warm start, after power off (failure) and communication break, if it was entered externally.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Simuwert** Simulation value	set point deletable float	-infinity	+infinity	deleted	--
2	**Loeschen** Delete after	set point selection list	--	--	1	selection list No.,text 0,after warm start 1,after decimal point

4.3.6.14.4. F014 Test value

Function summary

This object has a target parameter type (property as set point). A value that affects the target parameter can be entered in this parameter. The "test value" object is also in effect after a warm start or if the power is switched off or fails. It must either be deleted on the parameter or via a central parameter that causes the deletion that applies to all the set test values in the same central unit. If the object is entered to the parameter online it is retained even if communication fails with the entering partner.

Parameters

Nr.	Parametername	Parametertyp	Min	Max	Init	Einheit
-	-	-	-	-	-	-

4.3.6.15. BACnet function objects

4.3.6.15.1. FB_AI analog input

To transfer the DDC4000 parameters via BACnet the DDC4000 parameter must be assigned a BACnet ID and a BACnet type. To assign the BACnet types there are the following function objects:
FB_AV - BACnet Analog Value
FB_AI - BACnet Analog Input
FB_AO - BACnet Analog Output
FB_BV - BACnet Binary Value
FB_BI - BACnet Binary Input

FB_BO - BACnet Binary Output
FB_MV - BACnet Multistate Value
FB_MI - BACnet Multistate Input
FB_MO - BACnet Multistate Output

The appropriate function object must be selected in line with the value to be transferred. Within the function object a unique BACnet object ID must be assigned.

Alarms for BACnet??? such as are described in Start up ppt DDC3550-BACnet / COV...?

Function summary

BACnet-Analog-Input-Object" für das Anhängen an Parameter. Signaleingänge an Geräten (Inputs), die stetige Werte liefern, werden in BACnet als Analog-Input-Objekte abgebildet.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
ObjId	BACnet ObjId	set point integer	0	4194303	0	--

4.3.6.15.2. FB_AO analog output

Function summary

"**BACnet-Analog-Output-Object**" für das Anhängen an Parameter. Es wurde für Werte entworfen, die ein Ansteuersignal eines Aktuators darstellen. Im DDC4000-System werden diese Objekte benutzt um Parameter für die GLT analoge Sollwerte darzustellen.
Dies ist ein Anhangsobjekt, dass heißt, dass der Wert des Parameters an dem dieses Objekt angehangen worden ist auf einem BACnet als Datenpunkt erreichbar wird.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
ObjId	BACnet ObjId	set point integer	0	4194303	0	--
z	z	actual value boolean	--	--	0	--

4.3.6.15.3. FB_AV analog parameters

Function summary

Dieses Objekt soll an Parameter angehangen werden können, die ein BACnet-Analog-Value nach außen repräsentieren.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
ObjId	BACnet ObjId	set point integer	0	4194303	0	--
z	z	actual value boolean	--	--	0	--

4.3.6.15.4. FB_BI binary input

Function summary

Signaleingänge an Geräten (Inputs), die zwei diskrete Werte liefern, werden in BACnet als Binary-Input-Objekte abgebildet.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
ObjId	BACnet ObjId	set point integer	0	4194303	0	--

4.3.6.15.5. FB_BO binary output

Function summary

Binäre Zustände bzw. Werte, die auf einen Geräteausgang wirken, werden in BACnet als Binary-Output-Objekte repräsentiert.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
ObjId	BACnet ObjId	set point integer	0	4194303	0	--
z	z	actual value boolean	--	--	0	--

4.3.6.15.6. FB_BV binary parameters

Function summary

Dies ist ein an Parameter anhängbares DDC-Funktions-Objekt oder auch Anhangsobjekt. Es bewirkt, dass der Wert eines Parameters als ein BACnet-Binary-Value-Objekt auf dem BACnet sichtbar wird. Dieses Objekt ist als Anhangsobjekt für Parameter vom Typ Boolean konzipiert.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
ObjId	BACnet ObjId	set point integer	0	4194303	0	--
z	z	actual value boolean	--	--	0	--

4.3.6.15.7. FB_MI multistate input

Function summary

Signaleingänge an Geräten (Inputs), die mehr als zwei diskrete Werte liefern, können in BACnet als Multistate-Input-Objekte abgebildet werden.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
ObjId	BACnet ObjId	set point integer	0	4194303	0	--

4.3.6.15.8. FB_MO multistate output

Function summary

Analoge Werte, die auf einen Geräteausgang wirken, werden im BACnet als Multistate-Input-Objekte abgebildet.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
ObjId	BACnet ObjId	set point integer	0	4194303	0	--

No.	name of parameter	parameter typ	min	max	init	unit
z	z	actual value boolean	--	--	0	--

4.3.6.15.9. FB_MV multistate parameters

Function summary

Dieses Objekt kann an Parameter des Typs Multistate angehangen werden.
Dies bewirkt, dass der Parameter, an dem dieses Objekt angehangen worden ist, auf dem BACnet als BACnet-Multistate-Value-Objekt sichtbar wird.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
ObjId	BACnet ObjId	set point integer	0	4194303	0	--
z	z	actual value boolean	--	--	0	--

4.3.7. Sub-objects

4.3.7.1. Sub-objects

Sub-objects are definitions for the functions of certain objects. These sub-objects are used for example for outputs and inputs. A PIN object only receives its function by stipulating the type of sub-objects (e.g. binary input or output).

Sub-objects are used for example for

SBM51
PIN objects
FBM38

object no.	name of object	release stage: 24.07.2006
CAI	Analog input	0.1.9
CAO	Analog output	0.1.9
CB_NC	BACnetMsgDest	unreleased
CDI	Binary input	0.1.9
CDO	Binary output	0.1.9

object no.	name of object	release stage: 24.07.2006
CD_EL	Electrical counter	unreleased
CD_PU01	Basic fos max.	0.3.33
CD_PU02	Wilo Pump	0.3.33
CD_PU03	Double pump	unreleased
CD_SB51	SBM51 Menu	unreleased
CD_SB51S	Sim	unreleased
CD_WA	Water counter	unreleased
CD_WA01	Water counter	unreleased
CD_WA02	Water counter	unreleased
CD_WM	Heat counter	0.2.0
CD_WM01	Heat counter	0.2.0
CEth	Ethernet	0.3.33
CLI088	SNVT Alarm	unreleased
CLI095	SNVT Switch	unreleased
CLI106	SNVT Setpoint	unreleased
CLI108	SNVT HVAC Mode	unreleased
CLI109	SNVT Occupancy	unreleased
CLI112	HVAC Status	unreleased
CLI117	SNVT Setting	unreleased
CLO088	SNVT Alarm	unreleased
CLO095	SNVT Switch	unreleased
CLO106	SNVT Setpoint	unreleased
CLO108	SNVT HVAC Mode	unreleased
CLO109	SNVT Occupancy	unreleased
CLO112	HVAC Status	unreleased
CLO117	SNVT Setting	unreleased
CModMO	Module message	0.3
CPort	Port	0.3.33
CRS232	RS485 IP-conf.	0.3
CRS485	RS485 IP-conf.	0.3

object no.	name of object	release stage: 24.07.2006
CUser	User	0.1.9

4.3.7.2. CAI analog input

Function summary

Dieses Subobjekt stellt alle Funktionen und Parameter eines analogen Eingangs zur Verfügung. Es ist Bestandteil des PIN Objektes und kann dort durch den Konfigurations-Parameter aktiviert werden.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
b	**b** b	actual value deletable float	-infinity	+infinity	deleted	C
SType	**FTyp** Sensor type	set point multistate	--	10	1	value,text 0,0_10V 1,KP10 2,Pt100 3,Pt1000 4,Ni100 5,Ni1000 (DIN) 6,Ni1000 (L&G) 7,KP250 8,ML2 255,off

4.3.7.3. CAO analog output

Function summary

Dieses Subobjekt stellt alle Funktionen und Parameter eines analogen Ausgangs zur Verfügung. Es ist Bestandteil des PIN Objektes und kann dort durch den Konfigurations-Parameter aktiviert werden.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
y	**y** y Input	actual value deletable float	-infinity	+infinity	deleted	%
Y	**Y** Y Output	set point float	0	100	0	%

4.3.7.4. CDI binary input

Function summary

Dieses Subobjekt stellt alle Funktionen und Parameter eines binären Eingangs zur Verfügung. Es ist Bestandteil des PIN Objektes und kann dort durch den Konfigurations-Parameter aktiviert werden.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
k	**akt.k** Value BE	actual value deletable boolean	--	--	deleted	--

4.3.7.5. CDO binary output

Function summary

Dieses Subobjekt stellt alle Funktionen und Parameter eines binären Ausgangs zur Verfügung. Es ist Bestandteil des PIN Objektes und kann dort durch den Konfigurations-Parameter aktiviert werden.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
k	**akt.K** Actual value BA	actual value deletable boolean	--	--	deleted	--
K	**K** Binary output	set point boolean	--	--	0	--

4.3.7.6. CModMO

Function summary

(99x settable) This object is attached to objects from the Type SY_Module and is used to produce "module failure" plant messages. The "malfunction", "ErrNo", "DubAdr" and "Active" parameters for each SY_Module are monitored and if there is an ongoing malfunction in one of these parameters a corresponding plant message is generated. This message is distributed as per the plant messages by selecting a relevant message set.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**MSet** Selection MSet	set point deletable text	--	--	deleted	--
2	**E/A** ON / OFF	set point deletable boolean	--	--	deleted	--
101	**u** Module message	actual value boolean	--	--	0	--
102	**Status** internal Status	actual value multistate	--	6	0	value,text 0,Start 1,1. Logon running 2,Logged on 3,Logoff running 4,Logged off 5,Feedback running
201	**Delay** Delay	set point integer	1	3600	600	s
202	**MTxt** Message text	actual value multistate	--	5	0	value,text 0,OK 1,double address 2,Fault module 3,Malfunction 4,Fault Code

4.3.8. Device objects

4.3.8.1. Gateway Objects

4.3.8.2. Volume counter

4.3.8.2.1. CD_WA volume counter

Function summary

Dies ist ein Subobjekt für die wichtigsten Parameter eines Wasser-Zählers. Die hier enthaltenen Parameter sind das Minimum, das man von einem Wasserzähler erwarten kann.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
2222	**StörZähl** Fault counter	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
2251	**Ser-nr** Serial number	actual value text	--	--		--
2258	**Volumen** volume	actual value float	-infinity	+infinity	0	m

4.3.8.2.2. CD_WA Volume counter 01

Function summary

Dieses sind die Standard-Parameter eines Wasser-Zählers am M-Bus. Viele Wasser-Zähler am M-Bus bieten die hier enthaltenen Parameter an. Somit sind diese für viele Zähler geeignet, insbesondere auch für unbekannte Zähler.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
2212	**Betr.std** Operating time	actual value integer	-2147483648	2147483647	0	h
2222	**StörZähl** Fault counter	actual value boolean	--	--	0	--
2251	**Ser-nr** Serial number	actual value text	--	--		--
2253	**Volstrom** Volume current	actual value float	-infinity	+infinity	0	m/h
2258	**Volumen** volume	actual value float	-infinity	+infinity	0	m

4.3.8.2.3. CD_WA Volume counter 02

Function summary

Die speziellen Parameter für den Wasser-Zähler "IZWM" von Allmess Schlumberger.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
2212	**Betr.std** Operating time	actual value integer	-2147483648	2147483647	0	h

No.	name of parameter	parameter typ	min	max	init	unit
2215	**Volumen1** Volume 1	actual value float	-infinity	+infinity	0	m
2222	**StörZähl** Fault counter	actual value boolean	--	--	0	--
2251	**Ser-nr** Serial number	actual value text	--	--		--
2252	**Volumen2** Volume 2	actual value float	-infinity	+infinity	0	m

4.3.8.3. Electrical counter

4.3.8.3.1. CD_WM Electrical counter

Function summary

Die wichtigsten Parameter eines Wärme-Zählers. Die hier enthaltenen Parameter sind das Minimum, das man von einem Wärmezähler erwarten kann.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
2211	**Energie** energy	actual value float	-infinity	+infinity	0	kWh
2222	**StörZähl** Malfunction message	actual value boolean	--	--	0	--
2251	**Ser-nr** Serial number	actual value text	--	--		--

4.3.8.3.2. CD_WM Electrical counter 01

Function summary

Die Standard-Parameter eines Wärme-Zählers am M-Bus. Viele Wärme-Zähler am M-Bus bieten die hier enthaltenen Parameter an. Somit sind diese für viele Wärme-Zähler geeignet, insbesondere auch für unbekannte Zähler.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
2211	**Energie** energy	actual value float	-infinity	+infinity	0	kWh
2212	**Betr.std** Operation time	actual value integer	-2147483648	2147483647	0	h
2222	**StörZähl** Malfunction message	actual value boolean	--	--	0	--
2251	**Ser-nr** Serial number	actual value text	--	--		--
2253	**Volstrom** Volume current	actual value float	-infinity	+infinity	0	m/h
2254	**Leistung** Power	actual value float	-infinity	+infinity	0	kW
2255	**Vorl** Feed temp.	actual value float	-infinity	+infinity	0	C
2256	**Rückl** Return-flow temp.	actual value float	-infinity	+infinity	0	C
2258	**Volumen** volumes	actual value float	-infinity	+infinity	0	m

4.3.8.4. SBMs

4.3.8.4.1. SBM51

4.3.8.4.1.1. SY_SBM51 SBM51 control unit

Function summary

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
Cycle	**Cycle** Readout cycle	set point boolean	--	--	0	--
Enable	**Enable** Bus release	set point boolean	--	--	0	--

4.3.8.4.1.2. H004 SBM51_04

Function summary

Jedes installierte Objekt ist für genau ein Gerät am M-Bus zuständig. Der Objekt-Index der technischen Adresse ist mit der Busadresse am M-Bus identisch. Über den Parameter **Config** wird die Geräte-Klasse des konkreten M-Bus-Zählers ausgewählt, woraufhin ein zweiter Config-Parameter "**ConfigYY**" installiert wird, über den der Geräte-Typ ausgewählt wird. Aufgrund beider Auswahlen wird ein passendes Subobjekt installiert. ConfigYY steht für **ConfigE**L, **ConfigWA** oder **ConfigWM**. Siehe dort. Die Subobjekte CD_WM und CD_WA stehen für die "**Generischen Parameter**" der Geräte-Klasse, das sind die Parameter, die wirklich jeder Wäremzähler bzw. jeder Wasserzähler bieten sollte. Alle anderen Subobjekte haben mehr Parameter als nur die generischen.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
Active	**aktiv** Device active	actual value boolean	--	--	0	--
Anfrage	Counter inquiry	set point boolean	--	--	0	--
Config	**Medium** Counting medium	set point multistate	--	5	0	value,text 0,none 1,Electricity counter 2,Heat counter 3,Water counter 4,DDC3000-Menu
ConfigEL	**Elt-Typ** Elt-Counter type	set point multistate	--	2	0	value,text 0,Standard 1,Standard-Maximum
ConfigWA	**H²O-Typ** Water counter type	set point multistate	--	3	0	value,text 0,Standard 1,Standard-Maximum 2,Allmeas ISWZ
ConfigWM	**WMZ-Typ** Heat counter type	set point multistate	--	2	0	value,text 0,Standard 1,Standard-Maximum

4.4. parameterizing

4.4.1. Plant structuring

The "plant" and "group" address components can be used for later reuse and structured approach.

4.4.1.1. Plants

Why plants?

All the functions of a technical building plant can be summarized in "plants". This may include a contact output or a full air conditioning plant.

The term "plant" is just a sorting criterion. It is mainly used for structured visualization. All plants are offered to the user in the first operating page.

4.4.1.2. Groups

Why groups?

A group is a grouping of the functions from part of a plant. For example, a heating register can be summarized under a group. This would include e.g. the valve, sensor and pump. Within the "switch" page the group name would be inserted as a divider from the other LEDs.

A controller can be found in each group. Therefore an air conditioning plant for example can have a temperature control circuit in one group and a humidity control circuit in another group.

4.4.2. Malfunction message management

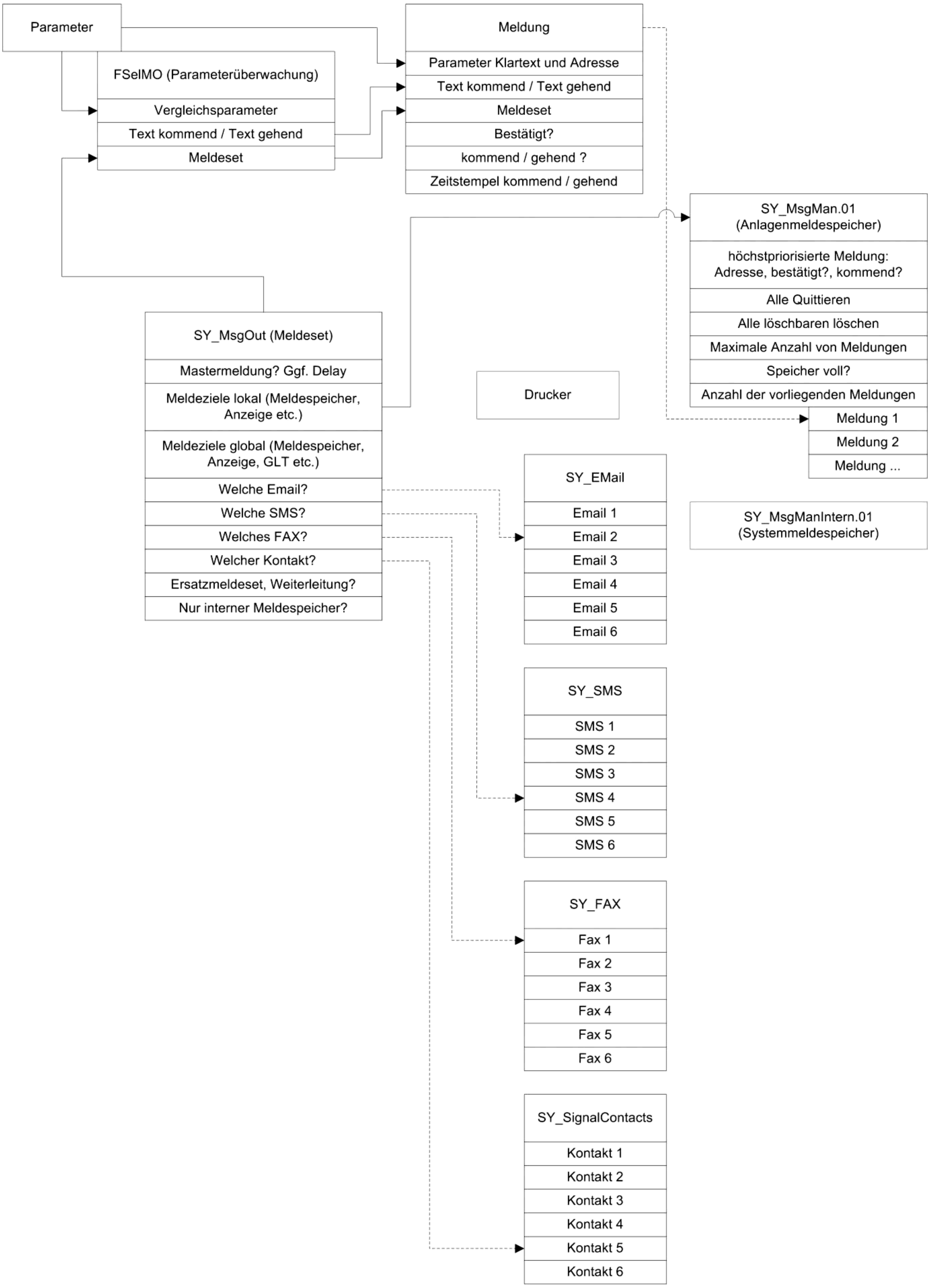
4.4.2.1. Plant messages

4.4.2.1.1. Messages

A message in the DDC4000 system is depicted via an attachment function FSelMo. The information for malfunctions (incoming message) and normal operation (outgoing message) are administrated.

Plant messages are generated if an appropriate parameter monitoring has been set.

Plant messages are generated in line with the status of the hardware of the separate control technology. Plant messages have a delay so that only ongoing failures are reported.


Parameter
FSelMO (Parameterüberwachung)
Vergleichsparameter
Text kommend / Text gehend
Meldeset
Meldung
Parameter Klartext und Adresse
Text kommend / Text gehend
Meldeset
Bestätigt?
kommend / gehend ?
Zeitstempel kommend / gehend
SY_MsgMan.01
(Anlagenmeldespeicher)
höchstpriorisierte Meldung:
Adresse, bestätigt?, kommend?
Alle Quittieren
Alle löschbaren löschen
Maximale Anzahl von Meldungen
Speicher voll?
Anzahl der vorliegenden Meldungen
Meldung 1
Meldung 2
Meldung ...
SY_MsgOut (Meldeset)
Mastermeldung? Ggf. Delay
Meldeziele lokal (Meldespeicher, Anzeige etc.)
Meldeziele global (Meldespeicher, Anzeige, GLT etc.)
Welche Email?
Welche SMS?
Welches FAX?
Welcher Kontakt?
Ersatzmeldeset, Weiterleitung?
Nur interner Meldespeicher?
Drucker
SY_MsgManIntern.01
(Systemmeldespeicher)
SY_EMail
Email 1
Email 2
Email 3
Email 4
Email 5
Email 6
SY_SMS
SMS 1
SMS 2
SMS 3
SMS 4
SMS 5
SMS 6
SY_FAX
Fax 1
Fax 2
Fax 3
Fax 4
Fax 5
Fax 6
SY_SignalContacts
Kontakt 1
Kontakt 2
Kontakt 3
Kontakt 4
Kontakt 5
Kontakt 6

Plant messages

Plant messages are used to monitor e.g. such malfunction statuses as malfunction messages or values exceeded e.g. for level monitoring.

The following must be defined for plant monitoring:
1. which parameter is to be monitored,
2. where the message is displayed or to where it is transferred.

Re (1)
To monitor a parameter a sub-object FSelMO is installed on the relevant parameter. The type of monitoring can be stipulated with the parameters for the FSelMO object.

Via parameter **3 E/A** you switch the monitoring on or off.

Parameter **2 monit** stipulates,
- whether '0' or '1' is the normal response (e.g. for binary parameters)
- whether monitoring is for falling above or exceeding a limit (for numbers) or
- whether equality or lack of equality is being monitored (for selection parameters or numbers).

In parameter **4 value** the comparison value is entered; this is compared with that of the monitored parameter, such as parameter **2 monit**.

A hysteresis for the comparison value can be set in parameter 5 Xdz (switch back difference). This prevents the occurrence of many messages if the parameter being monitored moves around the comparison value. This would produce messages time and again.

In order to provide operating staff with useful information if a message is produced, a text can be defined in parameter **6 Txt_IN** and this is output with the message if the monitored status occurs. Correspondingly a further text **7 Txt_OU** can be defined when a malfunction state is resolved. These are referred to as "incoming" and "outgoing" messages.

The current monitoring result is shown on **message output 101**.

After defining when a plant message is created, you must still define where and how it is displayed. For this a reference is entered on a s. g. message set (see below) in parameter **1 MSet**.

Re (2)
Up to 20 message sets (**system object SY_MesgOut**) can be defined and these define separately from the message where and how messages are processed.

Plant messages

Plant messages are produced by the plant automatically.

Plant messages can only be displayed on the relevant central unit; they are not transmitted to other central units. Certain groups of messages can be suppressed or displayed to facilitate trouble-shooting.

Potential groups of plant messages:
Central unit hardware

modules of CAN buses,
Ethernet bus (central bus)

4.4.2.1.3. Message memory SY_MsgMan

Function summary

(n x settable) This object is used as to save messages. When starting the plant in //000/00/00 the object *SY_MsgMan.01* of this type is created. All messages are attached to parameter 103 "akt Anz Meld".

Function description

If the maximum number of messages is reached a new message pushes out the message with the lowest priority. For this the following priority rules apply:

Priority class	Message status	Display on DDC4000 screen
1 (High)	incoming, not quit	red flashing triangle
2	incoming, quit	red constant triangle
3	outgoing, not quit	green flashing triangle
4 (Low)	outgoing, quit	green constant triangle

Within a priority class the oldest message has the lowest priority, and logically the newest message the highest.
If the maximum number of messages in the message memory is reset to a value that is smaller than the current number of messages deletions are also made as per the rules described above until the new maximum number is reached.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
101	**neuM** new message	actual value boolean	--	--	0	--
102	**quMS** MS receipt	set point deletable boolean	--	--	deleted	--
103	**aktM** act number msg	actual value integer	0	99	0	--
104	**löMS** MS delete	set point deletable boolean	--	--	deleted	--
105	**maxM** max number msg	set point integer	1	99	64	--

No.	name of parameter	parameter typ	min	max	init	unit
106	**voll** Memory full	actual value boolean	--	--	0	--
107	**kmdM** coming notification	actual value boolean	--	--	0	--
108	**glob Lö** global delete	set point deletable boolean	--	--	deleted	--
109	**vip-I** VIP Index	actual value deletable integer	0	99	deleted	--

4.4.2.1.4. Output definition SY_MsgOut

Function summary

(20x settable) In this object the output destinations ("message sets") are defined for messages.

In diesem Objekt werden die Ausgabe-Ziele („Melde-Sets“) von Meldungen definiert. Im Meldeüberwachungs-Objekt (FO_SelectionMessageOutput) kann im Parameter 1 „Auswahl Mset“ ein Melde-Set eingetragen werden, welches die Ziele der generierten Meldungen festlegt. Weiterhin kann zur Verzögerung bzw. Verhinderung von Meldeschauern eine Master-Meldung generiert werden.
Falls das Versenden von Meldungen fehlgeschlagen ist, kann ein Ersatz-Meldeset eingetragen werden.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
3	**glob** Dest. global	set point boolean	--	--	0	--
5	**SMS** Selection SMS	set point selection list	--	--	0	selection list No.,text 0,SMS No. 1 1,SMS No. 2 2,SMS No. 3 3,SMS No. 4 4,SMS No. 5 5,SMS No. 6

No.	name of parameter	parameter typ	min	max	init	unit
6	**FAX** Selection FAX	set point selection list	--	--	0	selection list No.,text 0,FAX-No. 1 1,FAX-No. 2 2,FAX-No. 3 3,FAX-No. 4 4,FAX-No. 5 5,FAX-No. 6
7	**Drucker** Selection printer	set point selection list	--	--	0	selection list No.,text 0,Printer 1 1,Printer 2 2,Printer 3 3,Printer 4 4,Printer 5 5,Printer 6
8	**Ersatz** Replacement MSet	set point deletable text	--	--	deleted	--
9	**weiter** Forwarding	set point multistate	--	3	0	value,text 0,no forwarding 1,destination error 2,no destination reached
201	**intMS** Goal Msp intern	set point boolean	--	--	0	--

4.4.2.1.5. Selection message set FSelMO

Function summary

(for each 99x can be set to any scalable parameters). This object activates the message monitoring of a scalar parameter. The object described below *SY_MsgMan.01* is used as a message memory. If the monitored parameter is a BoolPar 0 or 1 can be defined as a ok. If an integer or float is monitored, the limiting value and switch back difference is stated for releasing a normal message.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**MSet** Selection MSet	set point deletable text	--	--		--

No.	name of parameter	parameter typ	min	max	init	unit
2	**überw** Monitoring open	set point multistate	--	8	2	value,text 0,no monitoring 1,Switch to 0 2,Switch to 1 3,Exceeding 4,Falling below 5,Equality 6,Exceed or below 7,Invalid
3	**E/A** On / Off	set point deletable boolean	--	--	deleted	--
4	**oGw** Upper limit value	set point float	-infinity	+infinity	95	--
5	**Xdz** Switchback diff	set point float	0	+infinity	1	--
6	**Txt_K** Text coming	set point multistate	--	17	6	value,text 0,Controller damaged 1,Winter 2,Manual 3,active 4,abnormal 5,Maintenance 6,Malfunction 7,Alarm 8,Danger 9,Initial. 10,Optimization 11,ON 12,CLOSE 13,too low 14,too high 15,too hot 16,too cold
7	**Txt_G** Text going	set point multistate	--	8	4	value,text 0,Controller OK 1,Summer 2,Auto 3,inactive 4,normal 5,Normal operation 6,OFF 7,OPEN
8	**Delay** Delay	set point deletable integer	0	3600	deleted	s

No.	name of parameter	parameter typ	min	max	init	unit
9	**uGw** Lower limit value	set point float	-infinity	+infinity	0	--
10	**Testw** Test value	set point integer	-2147483648	2147483647	0	--
101	**u** Signaling output	actual value boolean	--	--	0	--
102	**Status** internal Status	actual value multistate	--	6	0	value,text 0,Start 1,1. Success msg active 2,normal 3,Error msg active 4,Failure 5,Success msg active

4.4.2.1.6. Sensor failure message FAIMO

Function description

(settable 99 times) The functional object FO_AnalogInputMessageOutput is used to monitor the sensor and generate sensor failure messages. For this purpose it is to be attached to the "b" parameter of a CO_AnalogInput. As such events as sensor breaking, short circuit, poling etc. are detected from this object only the validity of the "b" value is monitored but not whether limiting values are exceeded or undershot.
No sensor failure message is generated if the value of "b" has become invalid due to a module failure (or I/O card failure). Alternatively: sensor failure messages only make sense for registered modules (or I/O cards).
If a general failure monitoring is desired for all sensors within the central unit each related Type CO_AnalogInput object should have a FO_AnalogInputMessageOutput attached.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**MSet** Selection MSet	set point deletable text	--	--	deleted	--
2	**E/A** ON / OFF	set point deletable boolean	--	--	deleted	--
101	**u** Signaling output	actual value boolean	--	--	0	--

No.	name of parameter	parameter typ	min	max	init	unit
102	**Status** internal Status	actual value multistate	--	6	0	value,text 0,Start 1,1. Logon running 2,Logged on 3,Logoff running 4,Logged off 5,Feedback running
201	**Delay** Delay	set point integer	1	3600	600	s
202	**MTxt** Message text	actual value multistate	--	5	0	value,text 0,OK 1,Malfunction 2,Short-circuit 3,Sensor break 4,wrong poles

4.4.2.1.7. Modem configuration SY_ModConf

Function summary

The modem task provides all communication routes between a DDC4000 centre and the V.24 interface. For the DDC4000 message plant it means that the message destinations SMS, email, fax and BMS can be used by the modem task.

Function description

The configuration of the modem connected to the DDC4000 Central Unit occurs via the system object SY_ModemConfiguration.01. The modem's general operating parameters and the SMS dial numbers and protocols for the supported providers are shown here.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**Sender** Sender	set point text	--	--	+49-30-60095-0	--
2	**init1** 1. Initstring	set point text	--	--	AT|	--
3	**init2** 2. Initstring	set point text	--	--	atz|	--
4	**init3** 3. Initstring	set point text	--	--	att|	--

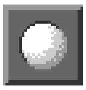
No.	name of parameter	parameter typ	min	max	init	unit
5	**esc** Modem Escape	set point text	--	--	+++	--
6	**hup** Modem Hangup	set point text	--	--	ath|	--
7	**SMSC_D1** Login SMSC D1	set point text	--	--	001712521002	--
8	**SMSC_D2** Login SMSC D2	set point text	--	--	001722278020	--
9	**SMSC_E+** Login SMSC E+	set point text	--	--	001771167	--
10	**SMSC_A1** Login SMSC A1	set point text	--	--	0w0	--
11	**Prot_D1** SMSProtocol D1	set point multistate	--	2	0	value,text 1,TAP8 2,UCP51
12	**Prot_D2** SMSProtocolD2	set point multistate	--	2	1	value,text 1,TAP8 2,UCP51
13	**Prot_E+** SMSProtocol E+	set point multistate	--	2	0	value,text 1,TAP8 2,UCP51
14	**Prot_A1** SMSProtocol A1	set point multistate	--	2	0	value,text 1,TAP8 2,UCP51
15	**IP SMTP** IP_AdrSMTP Serv	set point text	--	--		--
16	**AbsEmail** Sender E-mail	set point text	--	--		--
17	**FAX ID** FAX ID	set point text	--	--		--

4.4.2.1.10. Plant status - signalizing

Assignment of symbols and statuses in the quick start bar

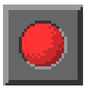
Plant overview
with quick start bar

With regard to the stated number for the priority, the highest value represents the highest priority.

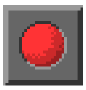


Off / automatic active
Priority 1

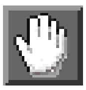
On / automatic active
Priority 2



Malfunction / automatic active - not confirmed (symbol flashes)
Priority 3



Malfunction / automatic active -   confirmed (symbol does not flash)
Priority 3



Off / manual influence available
Priority 4

O / manual influence available
Priority 5

Malfunction /manual influence available - not confirmed (symbol flashes)
Priority 6

Malfunction /manual influence available - not confirmed (symbol does not flash)
Priority 6

4.4.2.1.11. SMS

4.4.2.1.11.1. SMS numbers SY_SMS

Function summary

(1s settable) This object administrates 6 different SMS connections. The SMS numbers and the related participant names are saved as string parameters. There is no default entry.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	SMS Provider 1	set point multistate	--	4	1	value,text 1,D1 2,D2 3,Eplus 4,A1
4	SMS Provider 2	set point multistate	--	4	1	value,text 1,D1 2,D2 3,Eplus 4,A1
7	SMS Provider 3	set point multistate	--	4	1	value,text 1,D1 2,D2 3,Eplus 4,A1
10	SMS Provider 4	set point multistate	--	4	1	value,text 1,D1 2,D2 3,Eplus 4,A1
13	SMS Provider 5	set point multistate	--	4	1	value,text 1,D1 2,D2 3,Eplus 4,A1
16	SMS Provider 6	set point multistate	--	4	1	value,text 1,D1 2,D2 3,Eplus 4,A1

4.4.2.1.12. Email

Email in the DDC4000 takes place like this:
The DDC4000 has an email server that can send but not receive emails.
The email client communicates with an email server in the BMS that can forward the email as appropriate.
In place of the BMS it is also possible to state a different email server.

It is not possible to dial in by modem to an Internet provider to send an email.

4.4.2.1.12.1. Email recipient SY_Email

Function summary

(1s settable) This object administrates 6 different email connections. The email addresses and the related participant names are saved as string parameters. There is no default entry.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	EmailAdr 1	set point deletable text	--	--	deleted	--
2	Name 1	set point deletable text	--	--	deleted	--
3	EmailAdr 2	set point deletable text	--	--	deleted	--
4	Name 2	set point deletable text	--	--	deleted	--
5	EmailAdr 3	set point deletable text	--	--	deleted	--
6	Name 3	set point deletable text	--	--	deleted	--
7	EmailAdr 4	set point deletable text	--	--	deleted	--
8	Name 4	set point deletable text	--	--	deleted	--
9	EmailAdr 5	set point deletable text	--	--	deleted	--
10	Name 5	set point deletable text	--	--	deleted	--
11	EmailAdr 6	set point deletable text	--	--	deleted	--

No.	name of parameter	parameter typ	min	max	init	unit
12	Name 6	set point deletable text	--	--	deleted	--

4.4.2.1.13. Fax recipient SY_FAX

Function summary

(1s settable) This object administrates 6 different fax connections. The fax addresses and the related participant names are saved as string parameters. There is no default entry.

Parameters

No.	name of parameter	parameter typ	min	max	init	unit
1	**FaxNr 1** FAX Number 1	set point deletable text	--	--	deleted	--
2	**Name 1** Participant Name 1	set point deletable text	--	--	deleted	--
3	**FaxNr 2** FAX Number 2	set point deletable text	--	--	deleted	--
4	**Name 2** Participant Name 2	set point deletable text	--	--	deleted	--
5	**FaxNr 3** FAX Number 3	set point deletable text	--	--	deleted	--
6	**Name 3** Participant Name 3	set point deletable text	--	--	deleted	--
7	**FaxNr 4** FAX Number 4	set point deletable text	--	--	deleted	--
8	**Name 4** Participant Name 4	set point deletable text	--	--	deleted	--
9	**FaxNr 5** FAX Number 5	set point deletable text	--	--	deleted	--
10	**Name 5** Participant Name 5	set point deletable text	--	--	deleted	--
11	**FaxNr 6** FAX Number 6	set point deletable text	--	--	deleted	--
12	**Name 6** Participant Name 6	set point deletable text	--	--	deleted	--

4.4.2.2. Plant messages

Plant messages are saved in the message memory SY_MsgManIntern.01 that is created in // 000/00/00 when starting the plant. This object is used as an internal message memory. Messages with internal message memory destinations (e.g. messages during the start-up phase) are attached to parameter 103 of the SY_MsgManIntern.01. It is only possible to write in the local, internal message memory, not in the internal memories of other central units.

Object status

Each object has an object status with fixed defined priority statuses. The object status of a parent object is the result of the highest priority object status of its child objects.

Object statuses stating the priority

Lowest priority
1. Off / automatic active
2. On / automatic active
3. Malfunction / automatic active // not confirmed
3. Malfunction / automatic active // confirmed
4. Off / manual influence available
5. On / manual influence available
6. Malfunction / manual influence available // not confirmed
6. Malfunction / manual influence available // confirmed
Highest priority

<u>Creating an incoming message</u>

If a message monitoring was set up for any object's parameter and an incoming message was created the object status of the attached FO_SelectionMessageOutput changes to the value of 3 (not confirmed). If the object does not already have a higher priority object status this object status is adopted as per the mechanism described above.

By transferring the object status to the superior object, the object status is transferred up with the result that the operation during navigation by the plant tree indicates the constantly applicable plant status of the selected sub-tree (e.g. flashing warning triangle etc.).

The generated incoming message is written in the message memory and also has object status 3 (not confirmed).

<u>Confirming a message</u>

If the related message is confirmed in the message memory the object statuses of this message and the related message monitoring change to 3 (confirmed).

<u>Creating a normal message</u>

If the monitored parameter changes again to an uncritical value a normal message (=outgoing message) is generated by the message monitoring and the generated message taking on the object status 2 (ON/automatic active). The time stamp and message text of the normal event are inserted in the message.

The hardware components (module, sensor, component) are monitored using plant messages. Each hardware component to be monitored has parameters that describe the operating status. These parameters are controlled by a monitoring object for plant messages. The object has a delay function so that changing the value of these parameters releases a plant message after a delay.

Message monitoring object

The sub-object CO_ModulMessageOutput acts as a plant message monitoring object for all bus modules. It is attached as a child object to the SY_Module object of the module to be monitored. If the value of one of the malfunction parameters stated above is changed the attached child object CO_ModulMessageOutput is calculated and a message is generated if necessary after a delay

<u>Each group of plant messages requires specific solutions due to special requests and structures.</u>

Module messages

All bus modules have such parameters as "Active", "malfunction", "ErrNo" and "DubAdr". Each of these parameters is analyzed by the plant message monitoring. If an ongoing Active=0, malfunction=1, ErrNo!=0 or DubAdr=1 is detected after all three have previously had the inverted status, a malfunction message is generated. The normal message is then produces as appropriate.

Bus messages

If all the modules connected to a bus are constantly inactive within a time frame this is interpreted as a bus failure. Instead of individual module failure messages a single bus failure message is generated in this case. As soon as a module registers on an ongoing manner on a bus a bus normal message is generated. In this case a check is made as to whether all previously registered bus participants have logged in again. Failure messages are generated for those modules that are still inactive.

Sensor messages

Everything is viewed as a "sensor" that is connected to analog inputs. In this case the relevant pin object has a sub-object of type CO_AnalogInput with parameter "b". If this sensor is to be monitored a functional object of type FO_AnalogInputMessageOutputmust be attached to parameter b. If b takes on an invalid value on an ongoing basis after it was permanently valid previously, a malfunction message is generated. The normal message is then produced as appropriate.

Component messages

not yet stipulated

Plant message settings

not yet stipulated

4.4.3. Creating the customer interface

The user interface is created exclusively with the PS4000 parametering tool.
The first operating page is stipulated by structuring the plant. Therefore there is a summary of the plants in the DDC4000 Central Unit and a quick start bar on the first page.

Depiction of opening page with summary of all plants and the quick start bar

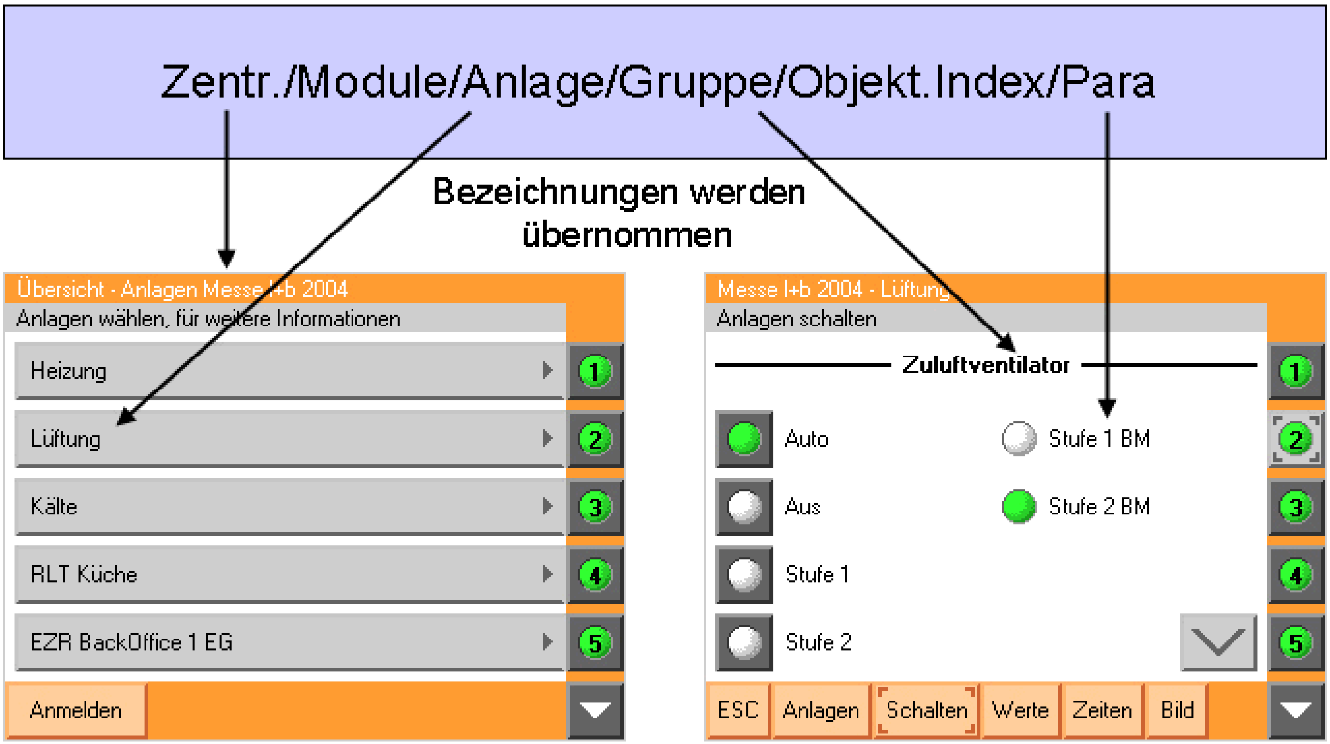
Groups may be located within the plants. The "switch" page is given the title that the group has in the DDC Central Unit. All binary information that have a tick under the "visualization in DDC" command is found under this title, e.g. "supply air fan". Switch groups or LEDs are inserted correspondingly.

The formation of the **"values"** page is similar. Here all the parameters that are displayed behind each other must also receive a command **"visualizing in DDC"**.

As the depiction is set in the DDC Central Unit a change to the visualization regulations can only be made via the tool. The page settings are generated here and stored as a data backup in the DDC Central Unit.

It is **not** possible to generate these pages in the DDC.

Relationship between address structure and operation



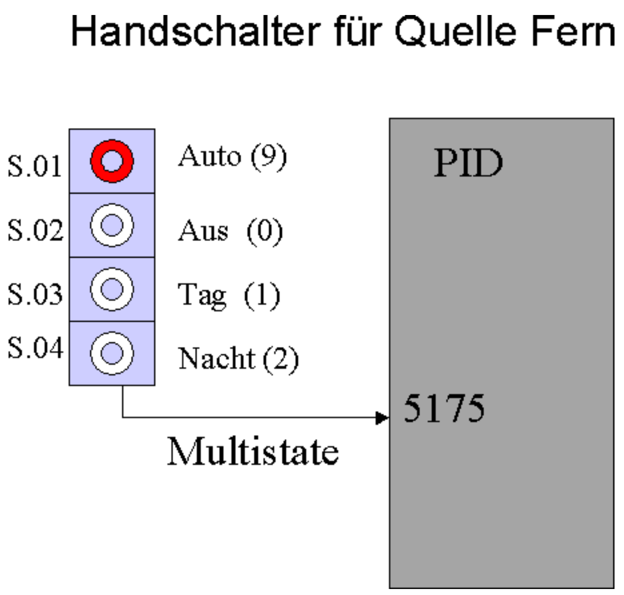
4.4.4. Integrating touch screen switches

The touch screen switches can be integrated in two ways.

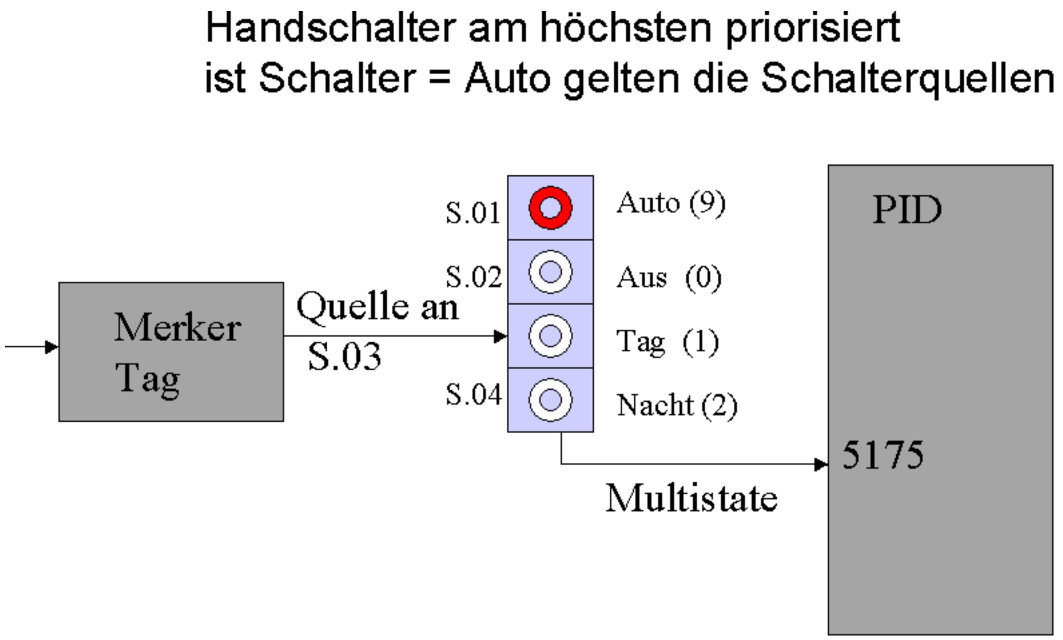
1. a function object switch can be attached to a multistate input. The output and input should match in terms of the values transferred.

2. switches can be set for basic object. This basic object can receive additional functions with other links.

Link switch S_42 with the PID basic program (fan)

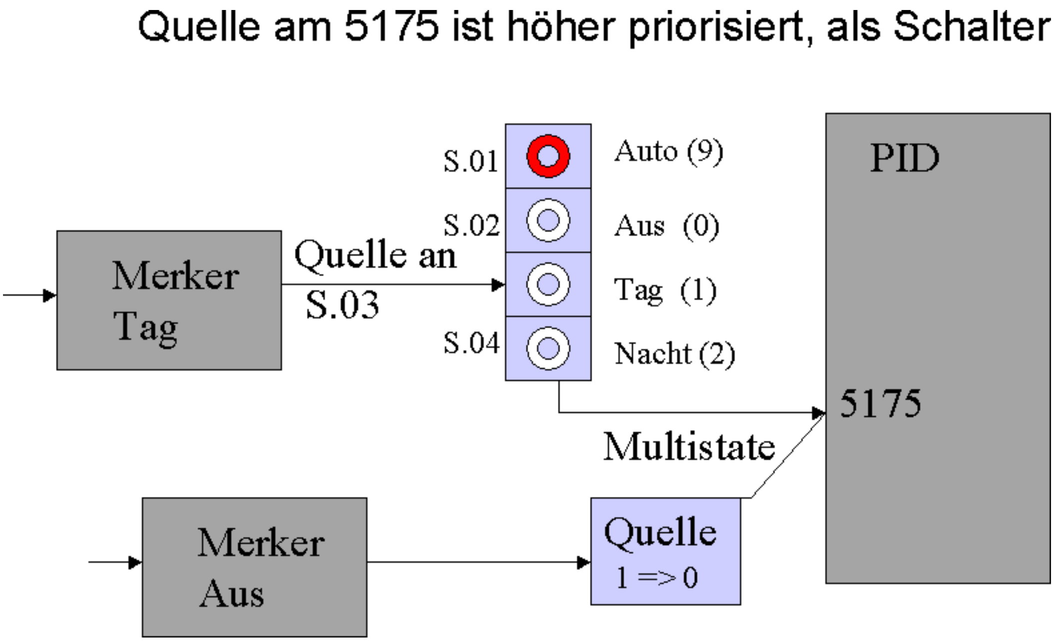


Link with additional outside influence in automatic operation



If the manual switch on the display is set to "Auto" the inputs are queried. Thus "day" was passed on to the control circuit. If the "Night" switch has been pressed the switch would have a higher priority and the "night" command would be sent to the control circuit.

How is the manual switch superposed?



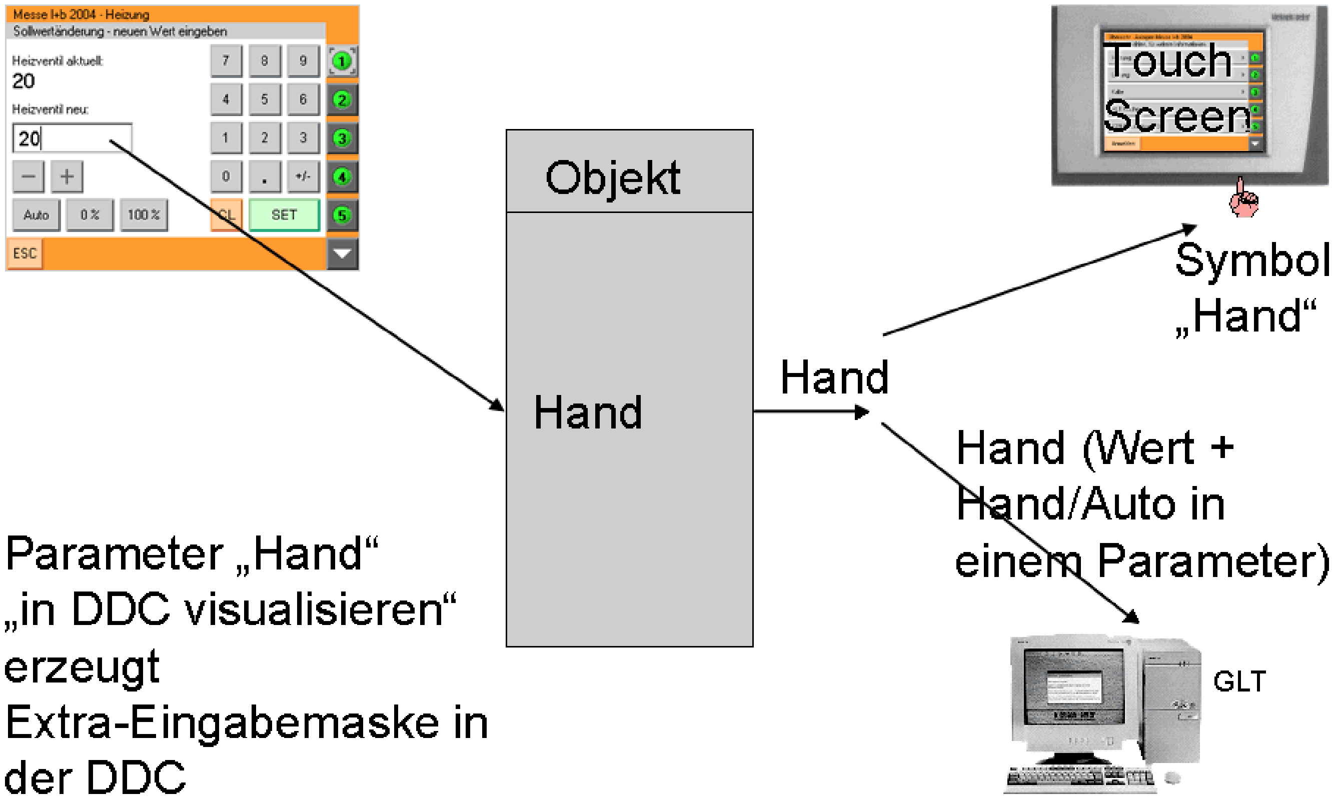
By attaching a "source" function object to in input of the control circuit the switch content can be overloaded?. So for example the control circuit can be switched by frost or a similar "Off".

The sources are also prioritized. If a further source is attached to the input parameter it finally describes the parameter and therefore has the highest priority.

4.4.5. Manual analysis

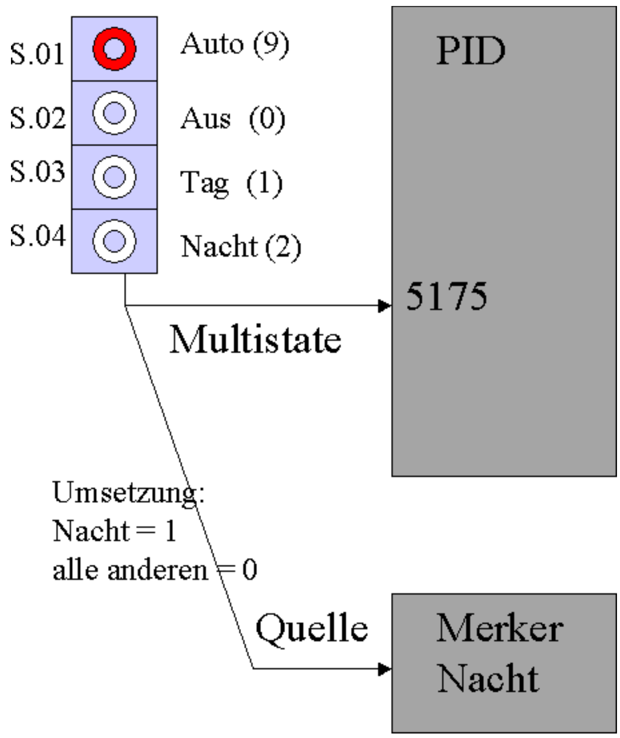
A "manual" input is found on the hardware objects. The input can receive the information "visualization = YES". This makes this parameter changeable in the interface of the DDC4000 Central Unit.
Then for "non-auto mode" the status is visualized in the quick start bar (right) by the hand symbol if a corresponding F017 was attached.

The value can also be used for visualization in the BMS.

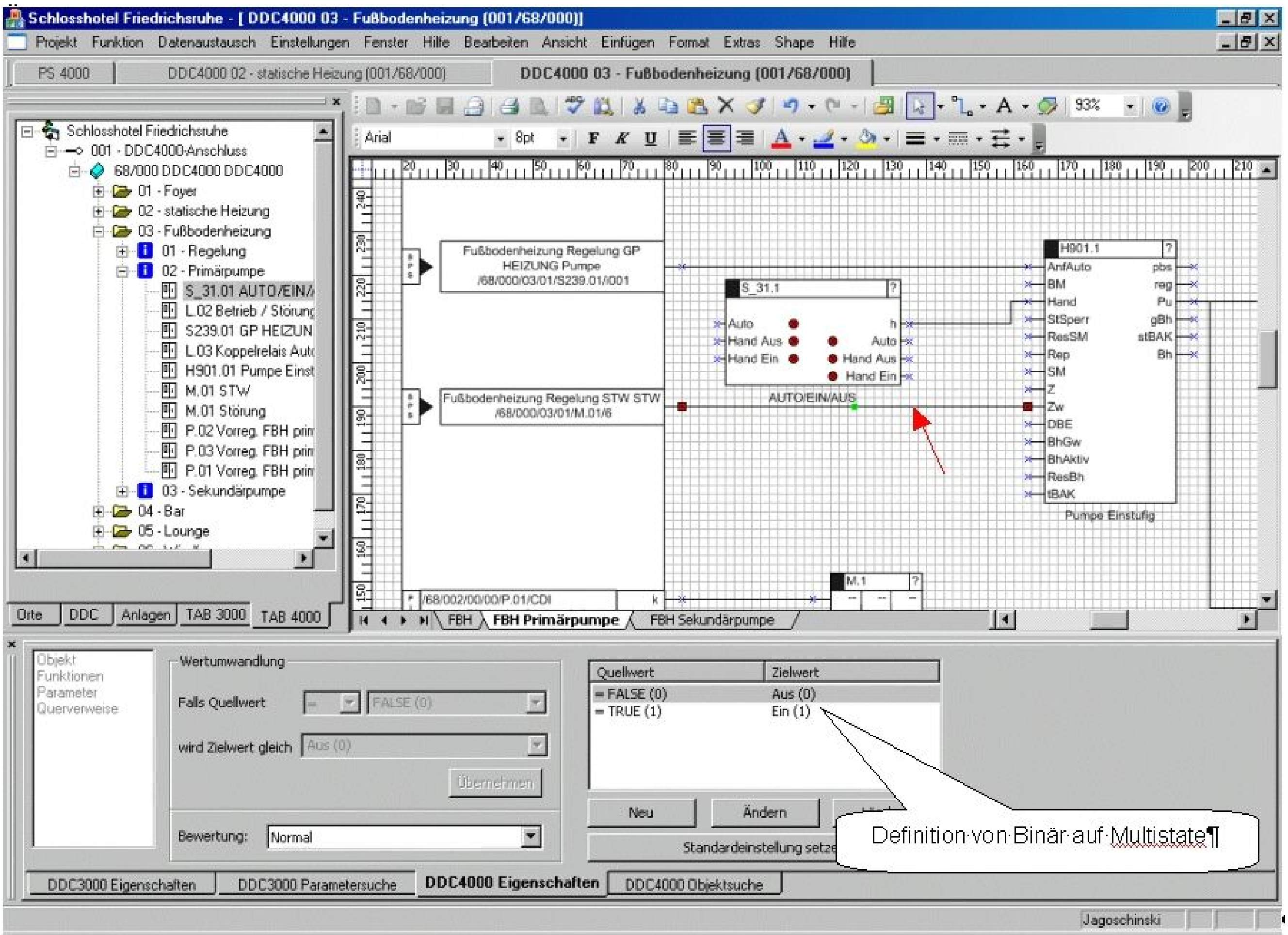


4.4.6. Converting multistate to binary

Multistate parameters are used in the DDC4000 system. If a status is to be used from these parameters, e.g. for links, this status must be filtered out and converted to a binary parameter. For this each multistate parameter in the PS4000 can be entered in a source that is normally designed for a binary value. By selecting the connection line there is the option of assigning a multistate value a 1 and other values a 0.



Schematic depiction of conversion



Depiction of conversion in the tool

The forced control (Zw) parameter is a multistate parameter. If the forced control is to have no effect on the HWO's output "Pu" "Zw" is to be set to "Auto".

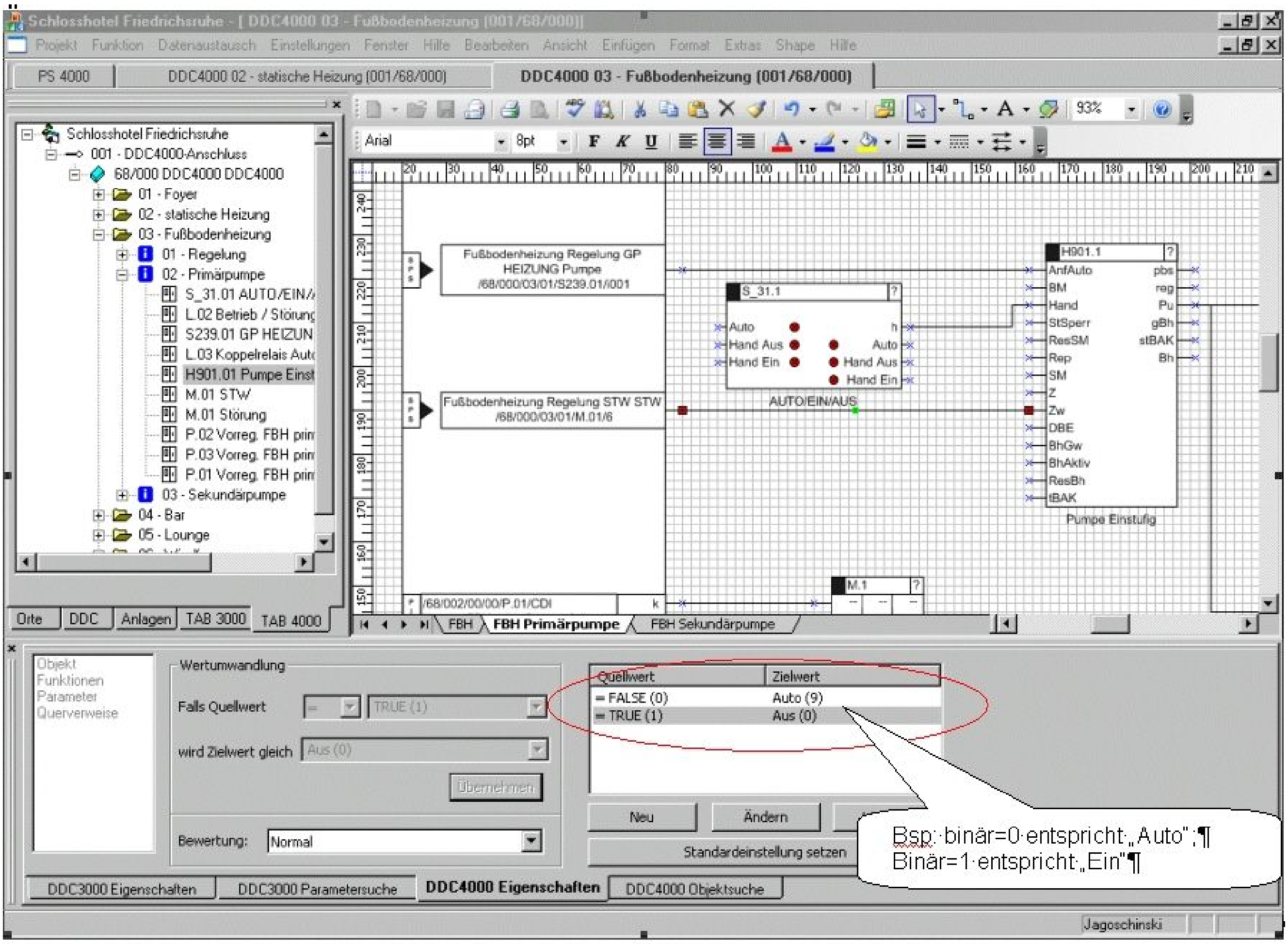
In the upper image the "Zw" is switched via a binary input. By defining the value conversion two multistate values are to be stipulated for the two binary statuses (off, on). The result is that for binary=0 the HWO is switched from "Zw" to "Off". The manual switch and the auto request have no influence on the "Pu" output.

The status control takes place as per the following priority: (Example: H901)

Priority	**Parameter / Value**	**Impact**
Highest	**SM**	Refer to "Trouble-shooting" section
	Manual/open, Zw/open, Rep	**Pu** = 0
	Manual/open, Zw/open	**Pu** = 1
	Z/closed, DOL	**Pu** = 0
	Z/On	**Pu** = 1

Priority	Parameter / Value	Impact
lowest	**AnfAuto**	if **AnfAuto** = 1, then automatic operation

The switching is correct in the lower image. If binary is 0, "Zw"="Auto". If binary=0 the manual switches and the auto requests also affect the "Pu" output.

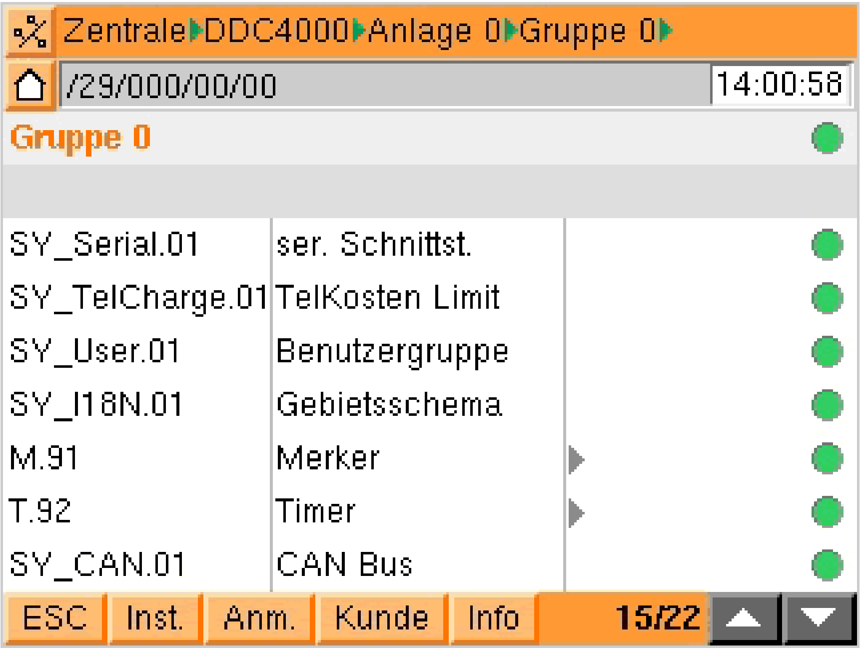


Conclusion:
When using binary switching of "Zw" always observe the value conversion. If the forced control should not act one of the binary statuses should retain the value "Auto".

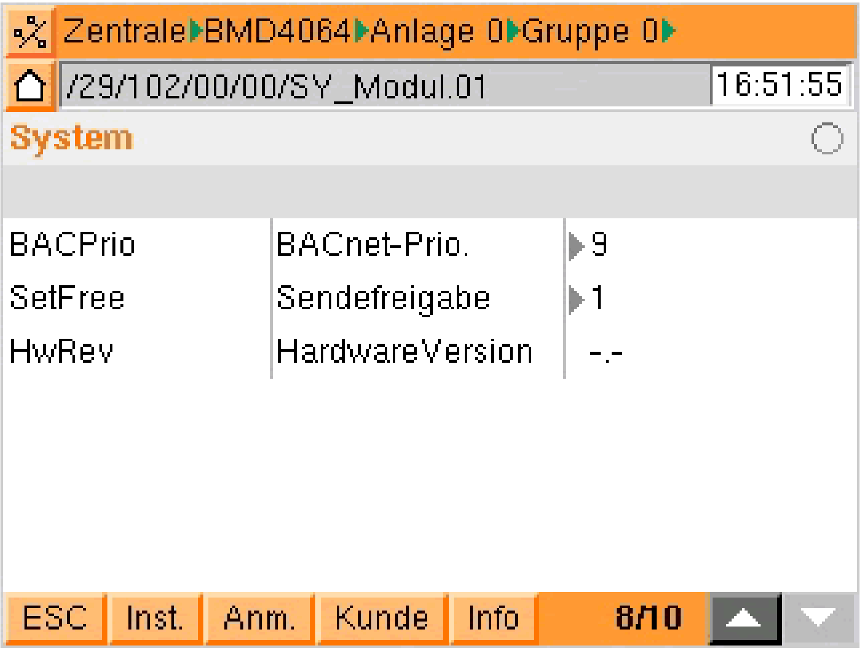
4.4.7. Network return

Network return in the DDC4000 system

A timer 92 is located in the DDC Central Unit. It is found in plant 0, Group 0. This timer is set automatically and starts up when the DDC Central Unit starts the control program. The parameter "t" on the T.92 becomes 1 after 60 seconds. "t" can be used for further connection (like I137 in the DDC3000 system).



Controlled DDC Central Unit start up
There is a "setfree" source parameter in each insert card and module.



This parameter includes a source.
If this source = 0, it blocks the physical outputs. This source is linked automatically with timer 92. If the DDC Central Unit is switched on, the time is 0. This blocks all the outputs. After the timer ends all outputs are released by this source link.

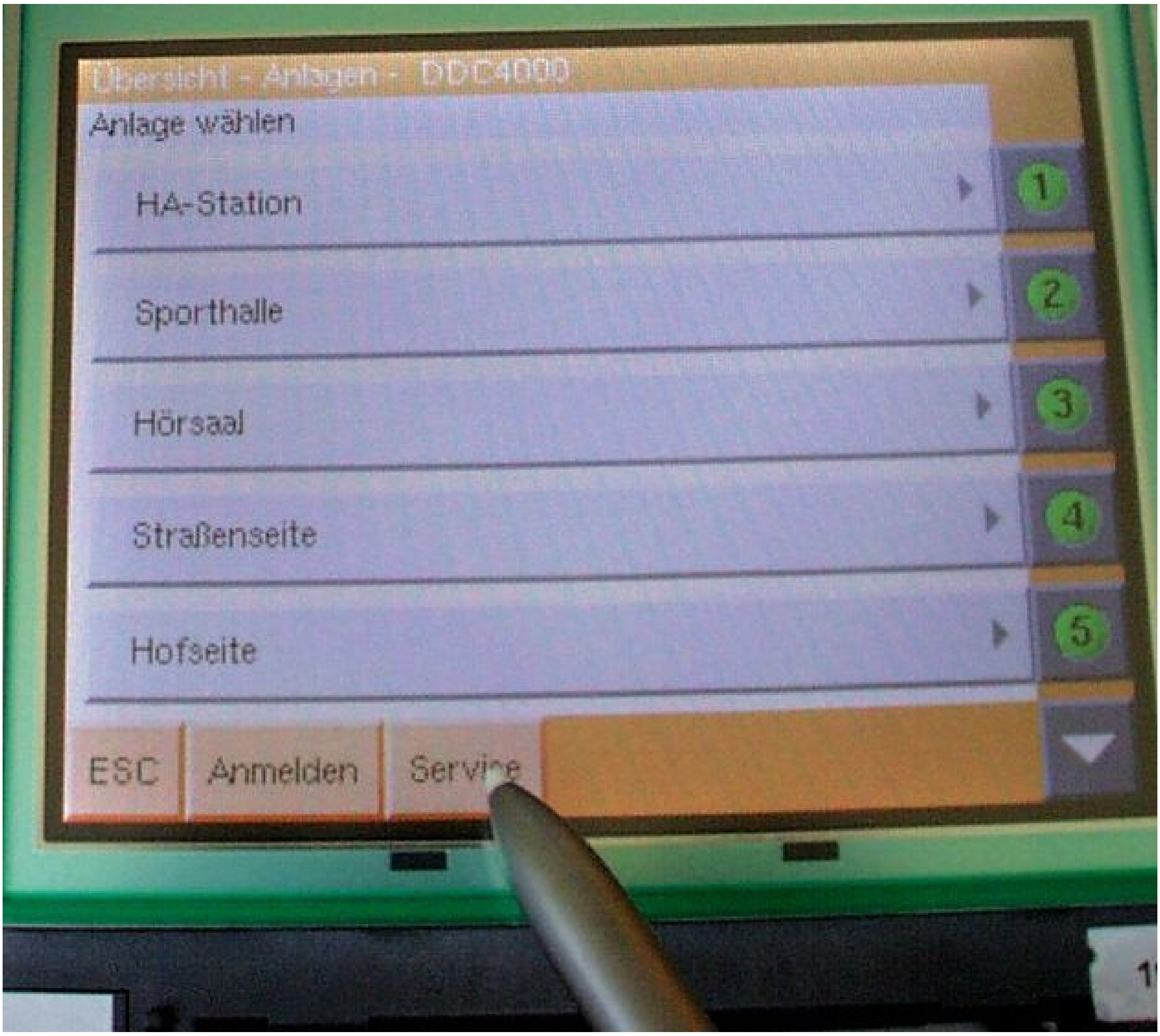
4.5. Service level, data (restore) backup, updates

4.5.1. Service level

4.5.1.1. Service level, access to parameterizing

Service level

The service level is offered when you log in with the relevant code. The screen is switched over by pressing the "service" button. This process may take a few seconds so that the pages to be displayed can be completed.



You can use the second column to navigate within the service level. If DDC4000 is activated you can then select the desired plant.

By selecting the central unit, plant "0" and then group "0" you enter the system object level.
Here you can select the desired system object.

The current value is in the right column in the parameter level. This field must be selected if you want to change the parameter value.

You move to a higher level by pressing ESC.

4.5.1.2. User administration

The user administration is not currently (2006) active. As a base of 3 users were introduced that match the code levels.

Users are administrated on various levels:

Users with the same name on various DDC4000 devices and a connected BMS are seen as the same user.
Users can be assigned various rights (code levels) on various DDC4000 devices. This assignment also applies to remotely controlled DDC Central Units, no matter whether via a different DDC or browser.

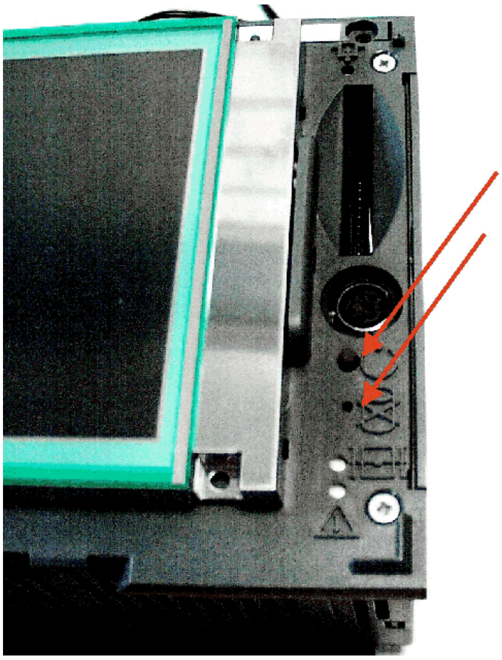
So for example it is possible to give a heating technician code level 3 on the "heating DDC" and only code level 1 on the "fan DDC".

Later for protocolling in line with FDA CFR21 Part 11 it will be possible to log any changes by a user to a DDC4000 on the BMS.

4.5.2. Import data, backups, software updates

4.5.2.1. Cold start, warm start, reset

Cold start



The process after removing the cover is as follows:

The button in the hole is pressed with a pen and held down (refer to image, lower button). Then press and hold the pen button (upper button).

Now release the button in the hole and hold the pen button for a further 3 seconds.
After finally releasing the pen the central unit will boot. A long acoustic signal is generated. This means that the cold start was successful.

Warm start

The process after removing the cover is as follows:

Simply press the pen button (refer to image, upper button).

The warm start saves for example current set point changes or time program changes and reboots the DDC4000.

Reset

The process after removing the cover is as follows:

The button in the hole is simply pressed (refer to image, lower button).

4.5.2.2. Import data - PS4000

The PS400 planning tool is used to import a projection.
The BACnet file object is used for transfer.

Prerequisites

- Laptop with network card, RJ45 connection
- Cross-over network cable (for a 1 to 1 connection from laptop to PC) or patch network cable (when connecting the DDC4000 e.g. via switches)

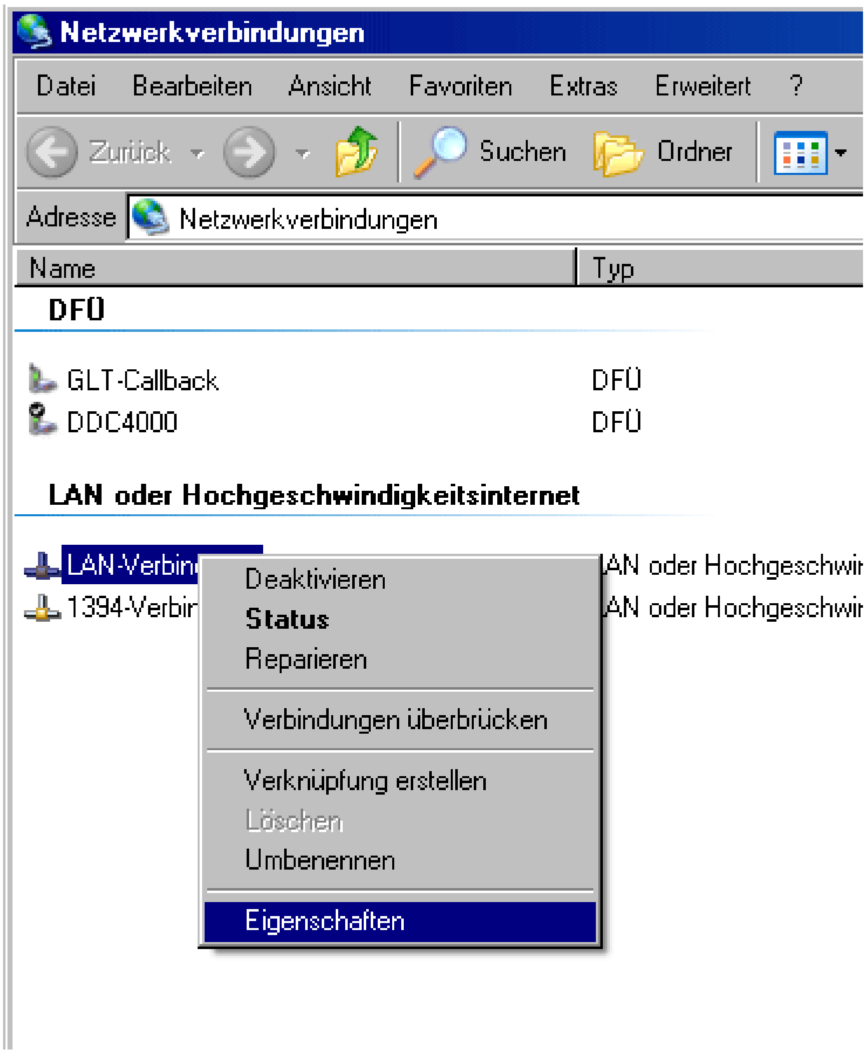
Pre-selections

The DDC4000 and laptop must be in the same network. For this it is necessary to set the IP addresses of the DDC 4000 and the laptop to the same sub-network.

Laptop settings (using Windows XP as the example)

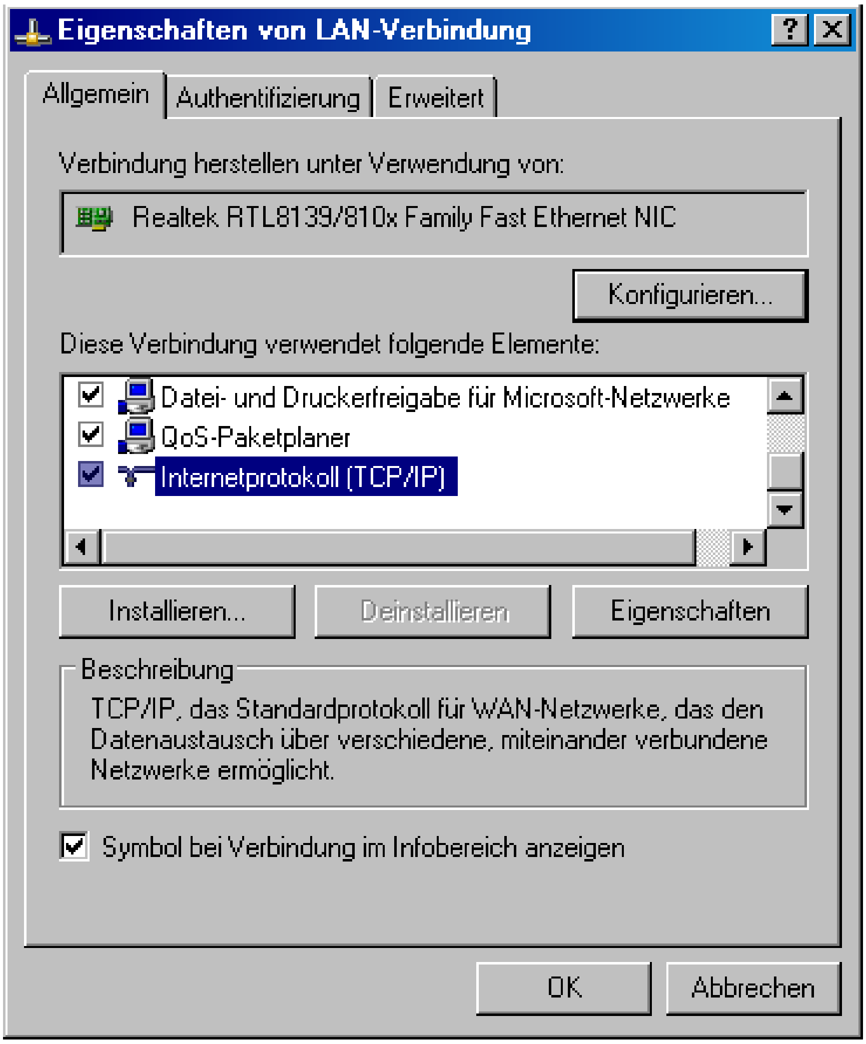
In the Windows taskbar click on <Network connections> via the following path:

Start --> Settings> --> Control panel --> Network connections

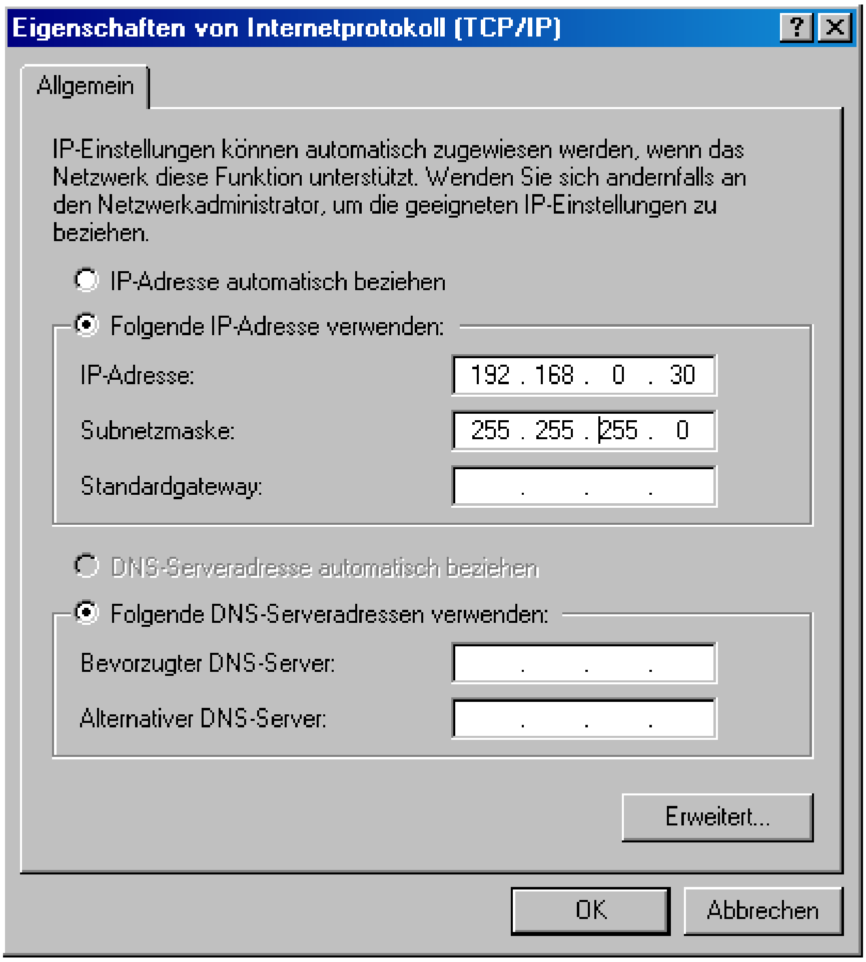


Select the corresponding connection from network connections (e.g. LAN connection) and right click on <Properties>.

kieback&peter



In the properties window displayed click on the <Internet protocol (TCP/IP)> element under <General> and click on properties.



A properties window for the internet protocol (TCP/IP) opens. Click on the "Use following IP address" option.

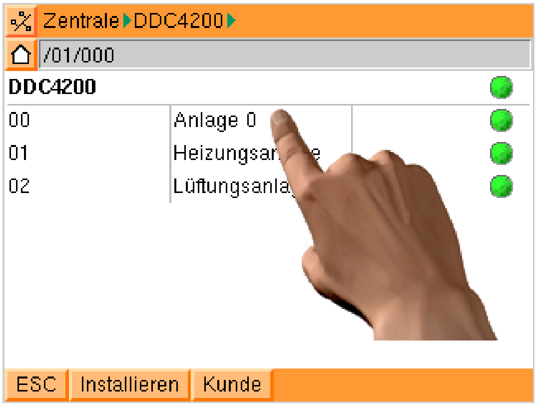
Enter the relevant IP address (e.g. 192.168.0.30) and the appropriate sub-network mask (e.g. 255.255.255.0).
For the example above the DDC4000's IP address may only contain 192.168.0.xxx for communication to be established.

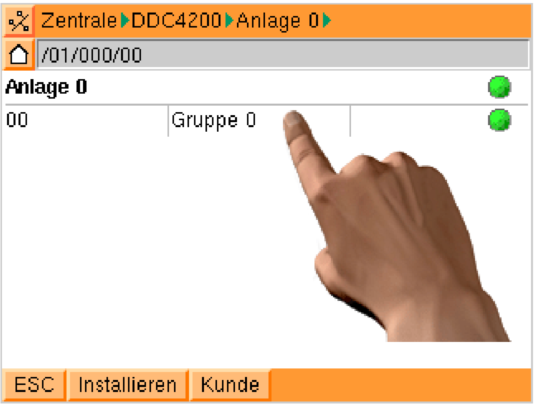
After changing a firmly assigned IP address the laptop must be restarted.

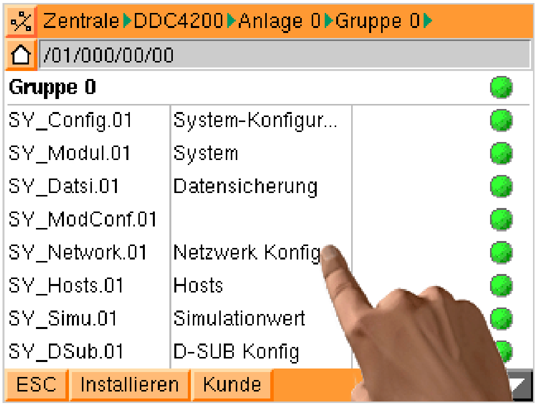
<u>DDC4000 settings</u>

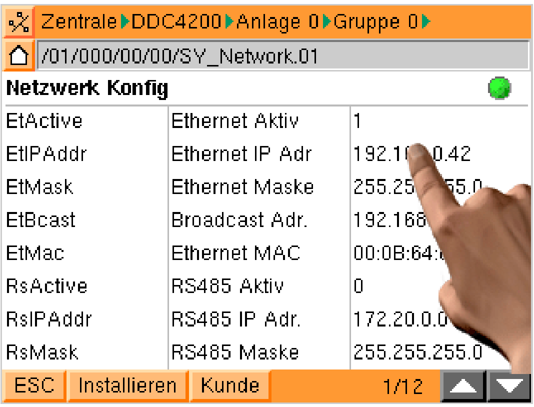
In the DDC4000 the IP address and sub-network mask must be adapted in the following parameters:

xx central unit
  000 Module (Module 000)
    00 plant (plant 0)
      00 group (group 0)
        SY_Network.01 Object.Index
          EtIPAddr Parameter (IP address)
          EtMask Parameter (Sub-network mask)
          EtActive Parameter (switching the Ethernet to active in the DDC4000)









The sub-network mask must be the same as in the laptop. The IP address must not be the same as in the laptop but must match the sub-network mask. The Ethernet must still be switched on via the <EtActive> parameter.

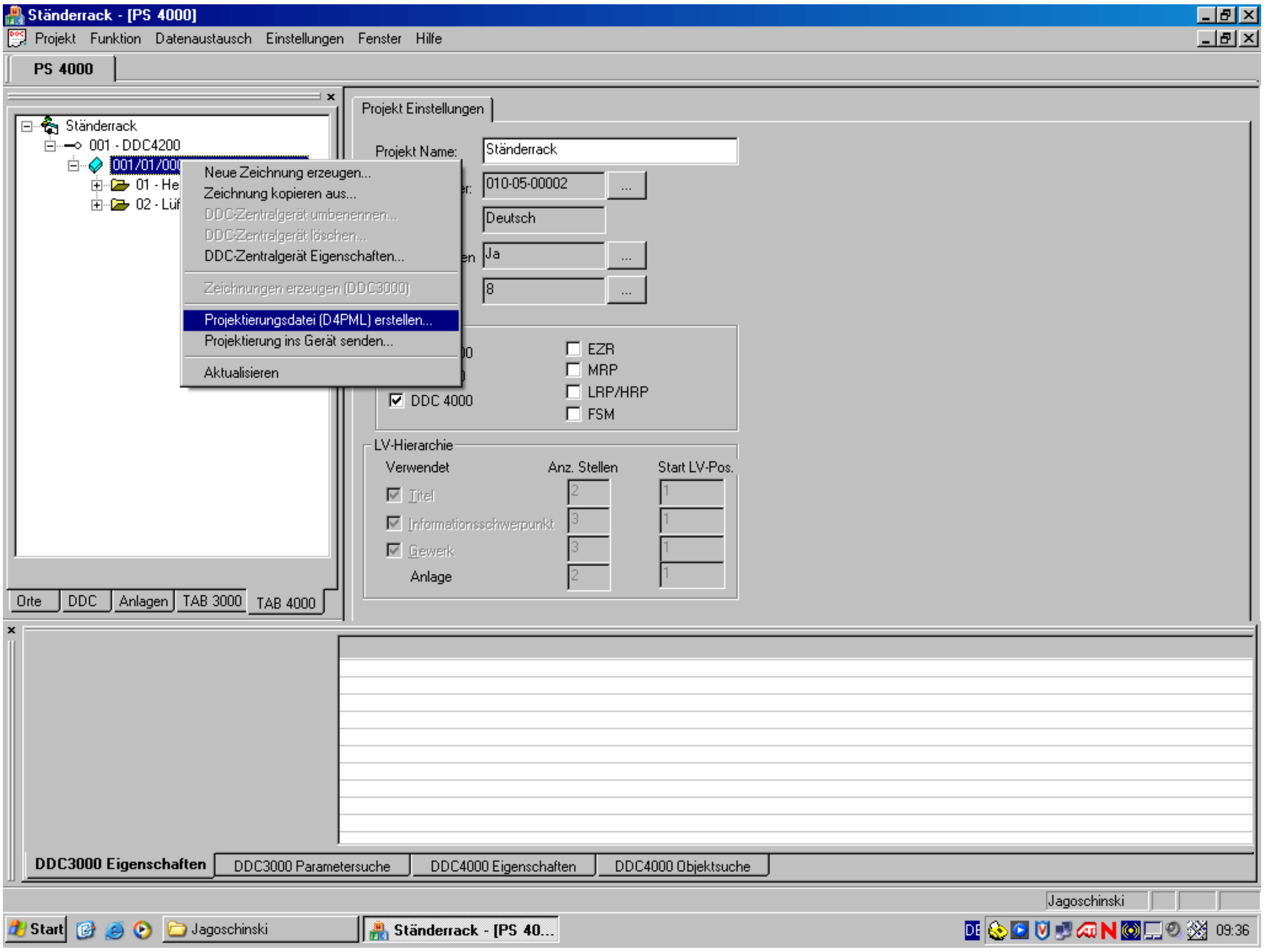
Now it is possible to access the DDC4000 from the laptop via Explorer. To do so enter the DDC4000's IP address in the address field in Explorer. If it is not possible to access the DDC4000 this may be due to the "Java 2 Runtime Environment" software not being installed on the laptop. This software must be installed and can be downloaded from the intranet from the following path:
Documents --> Technical --> DDC4000 system --> Network technology
It can also be found on the Internet by entering the search term "j2re".

Please note: Access from the browser to the DDC4000 is not required for importing data to the DDC.

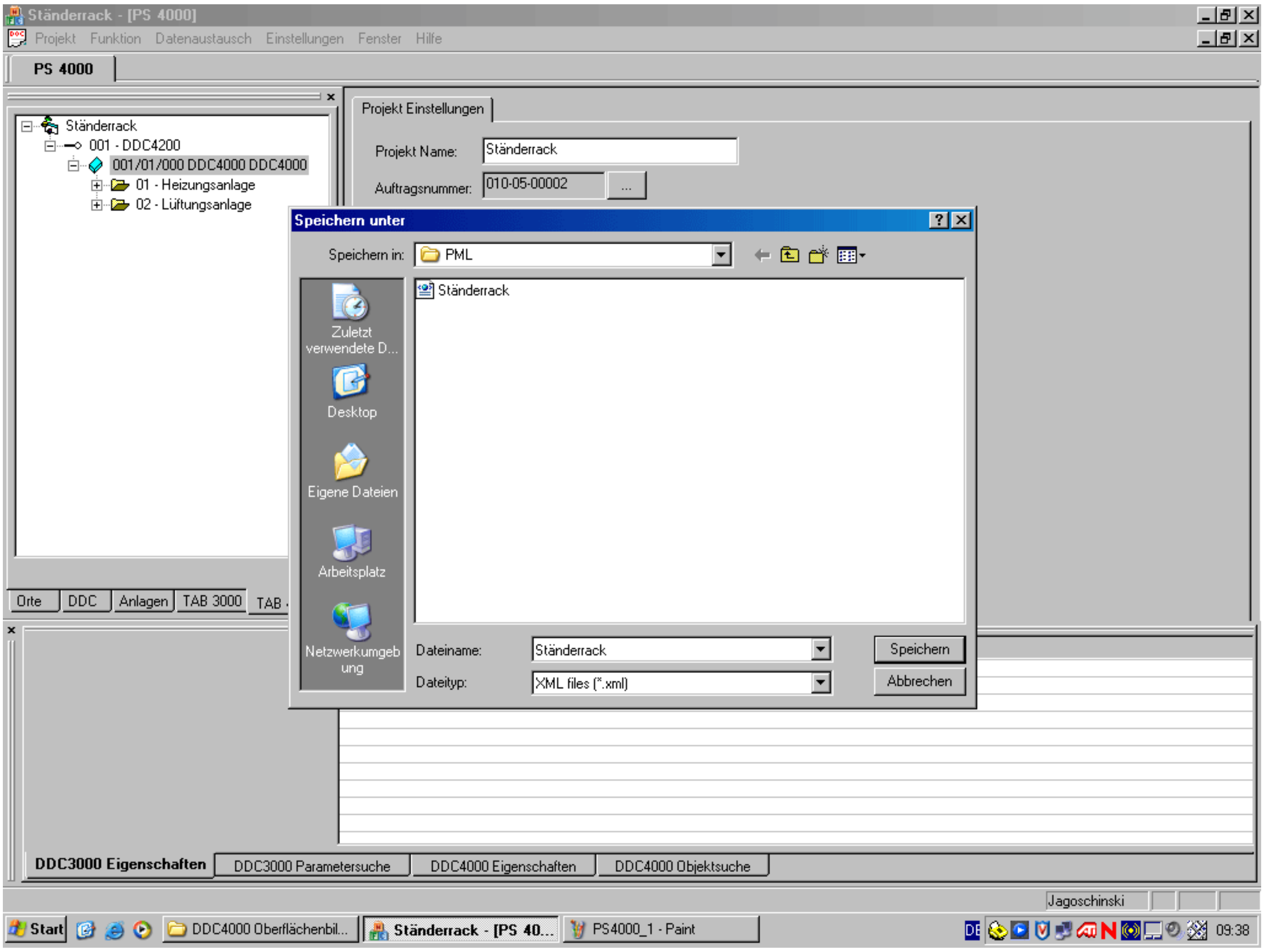
Send data

After making the default settings and an existing physical network connection, the projection is sent as follows in the PS4000:

In Project move to "TAB4000" and using the right mouse button click on a DDC4000 and select "Create projection file (D4PML)...". Ensure that the set IP and central unit address in the properties of the DCC4000 in the PS4000 agree with the settings on the DDC4000 device. The BACnet device ID set in the PS4000 is written in the DDC4000 and must not be set on the device.



Now the data backup can be assigned a name and saved. Then an automatic query appears as to whether the projection file should be transmitted. If you confirm this dialog box with "yes" the transmission of the file to the DDC4000 starts.

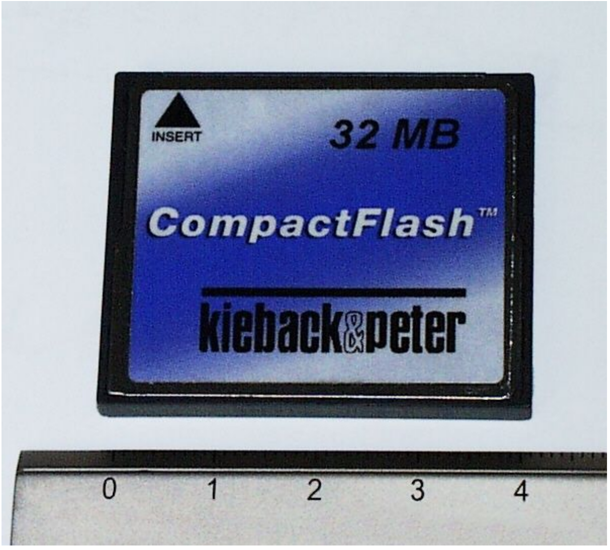


If a projection file has already been created you can send this immediately to the DDC4000. To do so in Project move to "TAB4000" and using the right mouse button click on a DDC4000 and select "Send projection to device...". Now the projection can be selected from a dialog (for example see image above) and then be sent.

4.5.2.3. Data (restore) backup CF card

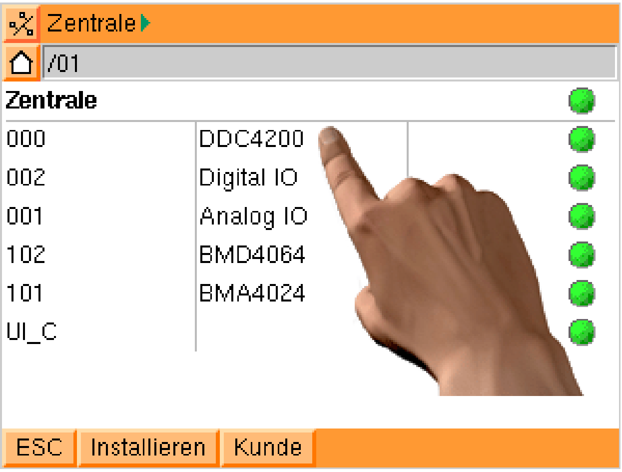
Data backup/file restoration with compact flash card

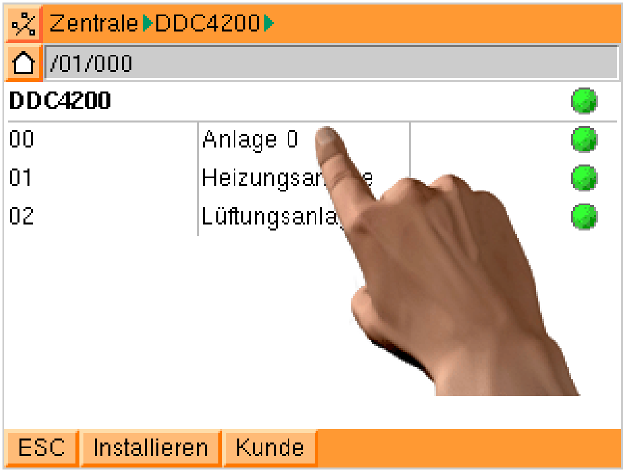
A CF (compact flash) card with 128 MB (32 MB in beta phase) is used as a data medium in the DDC4200.

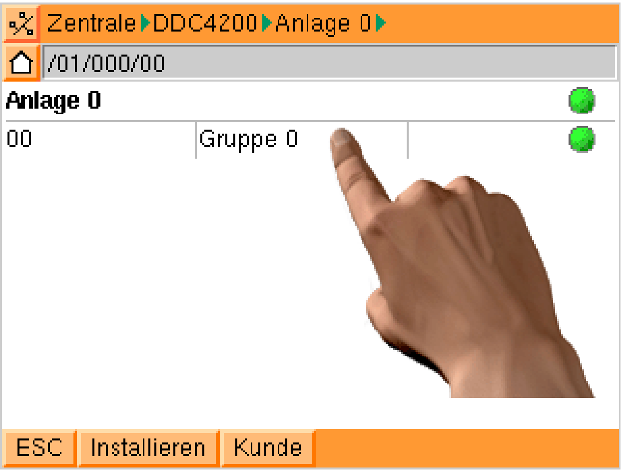


This card is inserted into the slot behind the front cover. The card's recessed grip is on the left.

This compact flash card provides data backup/file restoration. To do so the object **Sy-Datsi** in 01/000/00/00 (central unit/Module 0/plant 0/Group 0) must be opened.







As of August 2004:

Command is a set point. This value is set to 4 in order to force data backup on the front CF (compact flash) card.
The status **state** (6 - backup running) changes and in **procBar** you can see the progress from 0..100%.

This value is set to 5 in order to force data file restoration on the front CF (compact flash) card. The status **state** (7 - backup running) changes and in **procBar** you can see the progress from 0..100%.

For **Command** = 6 a firmware or program update of the card takes place. Refer also to software update.

Zustandswert	Zustandstext [de]
1	Bereit
2	Abbruch
3	BACnet-Anfrage
4	Datensicherung
5	Datenrücksicherung
6	Programmupdate

In order to ensure problem-free data file restoration a cold-start must be carried out **before** data file restoration.

Please note:For data file restoration the planning should be saved as an xml file with the file name "Datasave" on the CF card. Other file names are not considered for data file restoration with the aid of the CD card.

4.5.2.4. Data format

The data format of the backup is XML. XML means Extensible Markup Language. This stores the data backup in well structured plain text.

Please do no change this file. Even saving it with a normal editor can make this file unusable for the DDC Central Unit.
For interested parties: more information from:www.xml.com

4.5.2.5. Plant software update

Insert the card with the new firmware (software version) into the slot on the DDC4000 Central Unit and press Reset (place pen into the hole and activate hidden button with it).
The yellow LED should flicker for around 90 seconds and then "OK" will be displayed on the LCD.

Then remove the card and press Reset again.

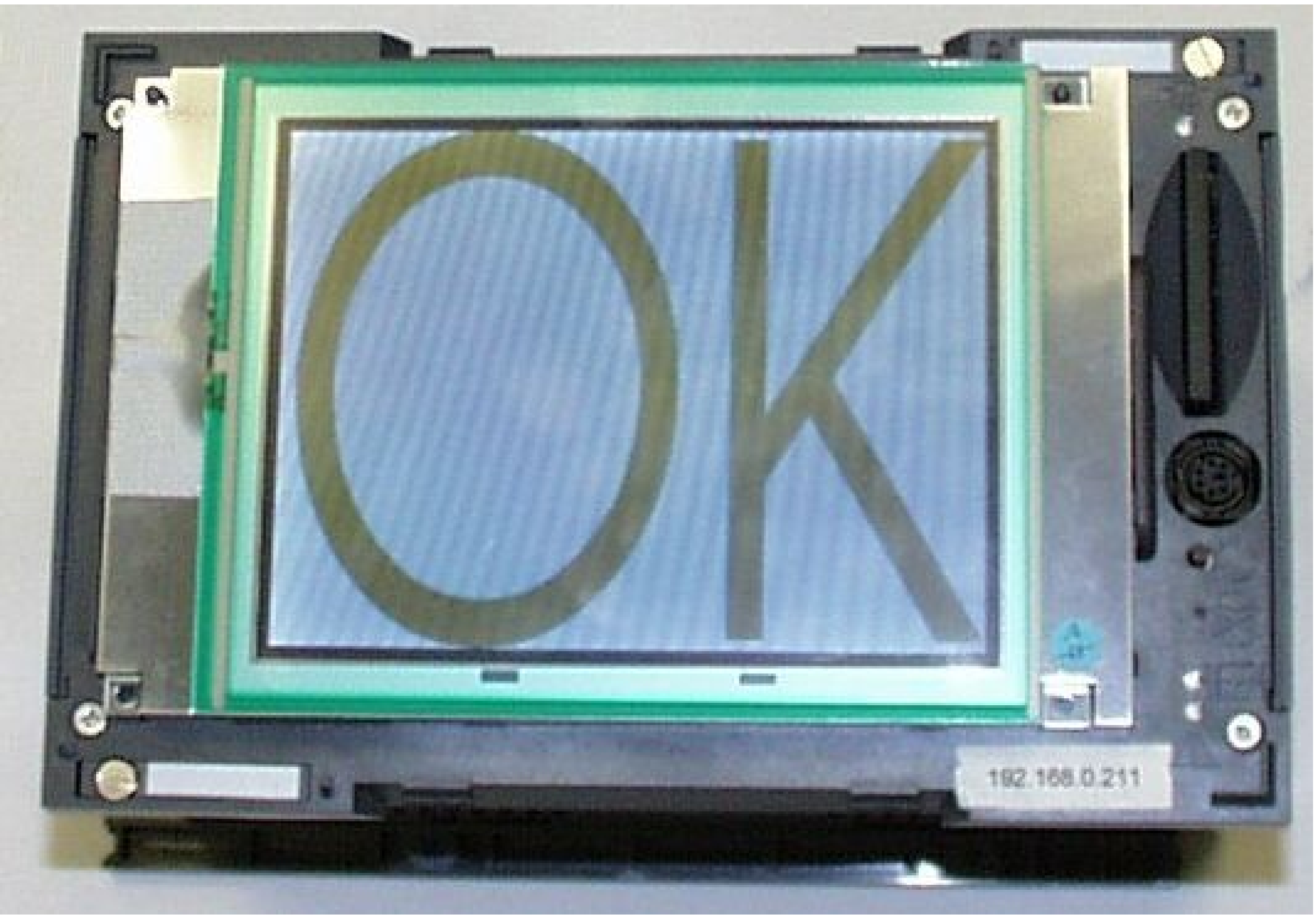
The device will now be booted with the new version of the program.

4.5.2.6. Update bootloader

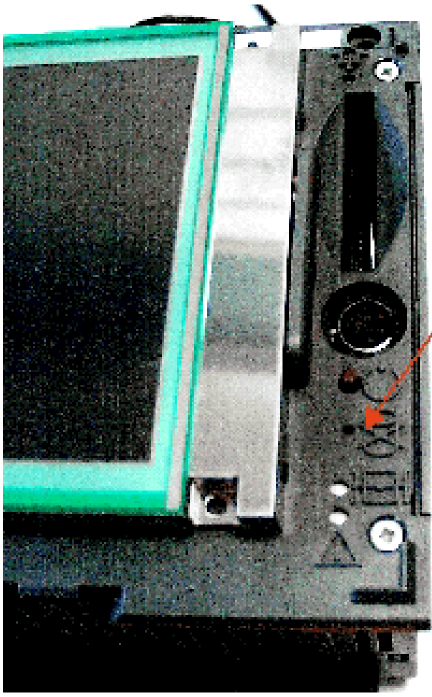
How is the boot loader renewed?

The compact flash card is inserted into the opening behind the front cover. Then a cold start is carried out.

During loading the screen turns grey. Then "OK" appears. Boot loader and program updates are made at the same time and register after completion.



To restart the DDC Central Unit, you must carry out a reset.



- Reset
- Die DDC-Zentrale wird unkontrolliert herunter gefahren
- Achtung! Daten können verloren gehen!